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*FOREST FLORA AND FOREST RESOURCES*  
*of*  
*Portuguese East Africa*



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# *Forest Flora and Forest Resources* of *Portuguese East Africa*

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*Tree-planting in Natal. Recent Information concerning South African Ferns, 1906. The Forests and Forest Flora of the Colony of the Cape of Good Hope.*  
*&c., &c., &c.*

*Illustrated by*  
*100 Plates, drawn by the Author*  
*representing 158 Species*

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## Preface

**I**N June 1908 the Governor-General of the Province of Mozambique did me the honour to invite me to join a Scientific Expedition which was then being sent by Government to inspect portions of the Province, with a view to assisting the development of such resources of these localities as are more or less allied to agriculture. Previous familiarity with the forests of other parts of South Africa, and their constitution, rendered such an opportunity to supplement that by a personal knowledge of the more tropical forests along the east coast desirable, so I accepted with pleasure, and spent several months during the winter visiting the various districts of the Province, in so far as time would allow, and making the forests, the botany, the arboriculture and the horticulture special objects of study. The result, in so far as the forests and forest flora are concerned, is embodied in the present work, which, beyond my own observations, records previous collections to the extent of allowing it to be a handbook of the forest flora based on available data, and indicative of the vast forest wealth of the district. It naturally takes at least a whole year's study of every portion of a country to supply the data necessary for a full and complete work of this nature, but that being impracticable in the present instance, a winter's tour has had to do instead, during which the trees were mostly in fruit but few of them in flower, and the few deciduous species were more or less leafless; it would be surprising therefore if omissions have not occurred, or if the information is not in some cases incomplete, but since the predominant and most important kinds have yielded material sufficient for identification, I feel satisfied that the production of this work, in its present form, serves the purpose intended by Government toward fostering the economic development of the Province, and especially of the districts visited, by aiding identification, by indicating qualities and uses, by reducing the vernacular nomenclature into intelligible order, and by showing in what localities and in what species value lies, and the possible means of converting that potential value into hard cash.

In accordance with a desire expressed, that readers should not be diverted from the main features for identification by the interpolation of full scientific descriptions of organs less essential for that purpose, the descriptions have been purposely made short and pointed, full botanical descriptions being in most cases redundant in view of their having already appeared in the "Flora of Tropical Africa," where however the local and economic aspects of my present subject are absent. For synonymy readers are also referred to the same work, which is an invaluable aid to every student of African botany, and in which the following collections from Portuguese East Africa have been dealt with, viz.:—From the Zambesi, Shire, Rovuma and Lake Nyasa, the collections made by Sir John Kirk, Dr. J. Meller, Dr. Peters and Mr. Horace Waller, have been used in all the volumes; while in all, except the first three volumes, there have also been used collections, mostly from Nyasa-land, made by Sir H. H. Johnston, K.C.B.; Rev. W. P. Johnston, Mr. J. Buchanan, C.M.G.; and Messrs. K. J. Cameron, J. T. Last, J. McClounie, L. Scott and Joseph Thompson.

I hardly require to repeat the warning given in so many forest works that vernacular names alone cannot be relied upon for identification, but they are useful aids if taken along with the botanical description. In the districts visited I found the vernacular names surprisingly constant within a tribe, and every man, woman and child knew that name; indeed the exact knowledge of the trees and the nature of their music were the two outstanding and surprising features in the sometimes very low type of humanity.

The reduction of the vernacular names into order has been a most difficult task, since the stem in most names is preceded by one of many prefixes which are used alternatively in accordance with grammar, usage or individual choice, while most of these prefixes begin with indistinct sounds not reducible to English letters, and often not fully pronounced, or lisped more or less from one sound into another ; in such circumstances indexing is very unsatisfactory, either by the prefix or by the stem. The exigencies of Portuguese politics, and the necessity to publish while funds are available, has rendered impossible the collation of specimens with other herbaria than my own, or even with works of reference not immediately at hand ; the specimens and information collected had, therefore, either to be dealt with at once or probably never, and I preferred the former, even though in some cases—such as *Ficus* and *Acacia*, it involved describing under a new name species which may possibly have been described before.

My aim has been to allow each of the trees yielding important economic products to be easily identified under some name,—which previously was not the case, through the publication of many names in scattered scientific pamphlets—the reduction of these, where necessary, to the first published name must wait the opportunities of those who have time and data in unlimited quantities.

Meantime the Province must be developed, and a saleable article must have some recognised name. The value of the timber in the Province is enormous, but that material will be gradually burned out to make way for cultivation unless utilized first.

My thanks are due to the Officers of the Government of the Province of Mozambique for kind assistance on every hand, but more particularly to His Excellency the Governor-General Major Frere d' Andrade, Dr. Saldanha and Dr. Sousa Ribeira, who were the prime movers in regard to the Expedition ; to O. W. Barrett, Esq., Director of Agriculture, who has rendered much valuable assistance ; and to Administrators Milicia and Alves, who, with extensive personal knowledge of the local products, did everything in their power to assist me. Also to James W. H. Trail, Esq., M.A., M.D., F.R.S., Professor of Botany, University of Aberdeen, whose co-operation has been invaluable, and to Messrs. Taylor & Henderson, The King's Printers, Aberdeen, who, at a distance of many thousand miles from the Author, have placed this work before the public in what I feel sure will be considered excellent form, in so far as they are concerned, within a few months of the completion of the journey which led to its production.

T. R. SIM.

JANUARY, 1909.

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## Languages

in which vernacular names are given, indicated in the text by the numbers attached :—

1. English.
2. Portuguese.
3. Dutch, as used on the Swazi border, *i.e.* Maputa and Marracuene.
4. Ironga, *i.e.* Native language at and near Lourenzo Marques.
5. Shengaan, *i.e.* Native language in Gaza.
6. M'Chopes, *i.e.* Native language in Zuvalla,
7. Landin, *i.e.* Native language between Inharreme and Inhambane.
8. Butonga, *i.e.* Native language at Inhambane.
9. Sofala or Senna, *i.e.* Native language at Beira and neighbourhood.
10. Echuabo, *i.e.* Native language in Quelimane District.
11. Swahili, *i.e.* Native language in northern part of Magenja da Costa, and northward.
12. Zulu, as met in Maputa and Zululand.
13. Kafir names used in Cape Colony, Transkei and Natal.
14. Dutch names used in Cape Colony or Transvaal.
15. Swazi names used in the Lebombo range.
16. Native names in Zambesia.
17. Names in use not included above.



PART I.

Forest Flora and Forest Resources



## CHAPTER I.

### Portuguese East Africa.

**P**ORTUGUESE EAST AFRICA constitutes what is officially known as the Province of Mozambique, and extends along the Indian Ocean from  $10^{\circ}$  S. to  $27^{\circ}$  S., being bounded by Natal on the south, Swaziland, Transvaal, Rhodesia and British Central Africa on the west, and German East Africa on the north. The outline is very irregular, the north-eastern portion being about  $40.5^{\circ}$  E., the south western  $32^{\circ}$  E., while an irregular arm extends up the Zambesi as far as Zumbo,  $30^{\circ}$  E. It thus contains approximately 760,571 square kilometers (= 300,000 sq. miles), and has a population estimated at 2,650,000.

**History.** What its ancient history may have been hardly affects our subject, but its more recent history begins with the discovery on its coast in 1498 by Vasco de Gama of several bays and estuaries suitable for commerce, since which date the seaboard has remained under the Portuguese flag. Occupation by the Portuguese of various ports began soon after the above date, and such towns as Mozambique, Quelimane and Inhambane have been in existence for about 400 years. The hold upon the back country, however, was for long of a very nominal nature, and it is only within recent decades and since the adjustment of the borders, that military occupation of the outlying districts has been seriously taken in hand; indeed there are places still which can hardly be said to be officially occupied, and which are almost unexplored.

**Occupation.** Official occupation usually begins with the residence of a military Commandant, who exercises powers somewhat similar to those conferred under martial law in British colonies, and is supported by a military force composed almost entirely of natives; this is superseded as soon as practicable by civil administration under the laws of the Province, the Resident then being Administratador, and supported by only a small police force. In each case the duties of keeping the peace and collecting taxes (hut-tax in some places, poll-tax in others) falls upon the officer in charge, who also has to have such roads cut through his district as are necessary for these purposes.

**Population.** Apart from the few towns and villages, the population is almost entirely native, and except the southern districts the country can hardly be regarded meantime as a white man's country, though the control of all industrial, as well as official, work and also the management of machinery, &c. is, and probably always will be, in European hands, the manual labour devolving upon the native.

In some large districts meantime the few officials form the entire non-native population; in two districts visited by me the Administratador and his clerk were the only such, except a few Indian traders known as Banyans. The natives are of many tribes, mostly of Bantu origin, but differing in their customs and instincts and speaking different languages, there being about ten distinct native languages used in the Province, besides dialects; these, together with Portuguese (the official language), English, Dutch, German, Spanish, French, and various Indian and Arab languages, constitute a fair babel, out of which I have had to cull the information contained in this work, in so far as it is not supplied by the trees themselves.

**Physical Features.** In physical features the Province may be described as a nearly level more or less sandy plain, with isolated kopjes in the north, and rising rather abruptly to a low mountain range on its western boundary, and crossed by numerous rivers, several of which are navigable for many miles, while others, navigable inland, are closed from the sea by a sand bar. The soil in such river valleys as those of the Limpopo and the Zambesi is of the richest alluvial; elsewhere the soil is more or less sandy loam, except on the western hills which are of igneous rock, often fully exposed, and seldom covered with sufficient soil to support full vegetation. The underlying strata from Beira northward are composed of rocks correlated with the Swaziland system of the Transvaal and with the gold-bearing strata of Rhodesia. These rocks probably roughly correspond in age with the pre-cambrian rocks of England. South of Beira the underlying strata consist largely of rocks belonging either to the tertiary or cretaceous systems, in places beds of conglomerate being present and are fringed along the western border by rhyolites. In the north this is divided from the Archaean rocks by a band of igneous rocks, made up of porphyry, &c. In popular language the soil may be described as mud on the flats, sand elsewhere, and solid rock on the hills; surface rocks or stones are entirely absent on the flats, while toward the coast lakes and lagoons exist in some places, and considerable areas are more or less under water during summer, which, for cultural purposes, might be rendered fit by deep surface drainage.

**Vegetation.** The vegetation varies with the district, but in a general way it is an open thorn-veld in the southern districts, a light bush-veld from the Limpopo northward, and a dense and sometimes heavy forest north of the Zambesi. Grass-veld occupies the open valleys, and in the more open thorn and bush-veld grass is abundant as undergrowth, the annual grass fires doing an immense amount of injury to trees; only those of the thorn group (Acacias, &c.) endure such repeated scorching and consequently continue to exist where other kinds are killed out.

**Native cultivation.** The natives usually do enough cultivation to supply their own wants, and in some places grow ground-nuts, mealies, sesame, &c. for export, but the money brought into the Province during recent years from the Transvaal by natives who have gone there to work, has rendered the native population less dependent on its own agricultural industry, and consequently less inclined to grow crops beyond what are required to meet its own immediate wants. With the improvident and thriftless habits of the natives local famines are not uncommon, and are often preceded by the undue consumption of edible products in the form of fermented or distilled liquors. The export of native products has decreased very considerably during recent years, mostly through the export of labour which has not been an unmixed blessing.

**Stock and Transport.** From various causes, mostly preventable, including rinderpest, fly-horne diseases, and the high prices consequent on these, cattle are scarce everywhere, and through large districts entirely absent; horses are subject to horse-sickness unless stabled at night and otherwise cared for, mules are not immune from the same trouble, and donkeys are too light for the mud and sand, so transport is meantime difficult and expensive, native carriers being in all remote districts the only power available. There are, however, several railway systems, viz. :—

- (1) Caminho Ferro, Lourenço Marques, crossing the Province from Lourenço Marques to the Transvaal border where it joins the Central South African Railway and so connects the Portuguese port with Pretoria, Johannesburg, Barberton, Komati, and the rest of South Africa.
- (2) The Swaziland line from Lourenço Marques, intended eventually to be carried through Swaziland and to form the shortest route to Johannesburg. A small branch from this line has its terminus at the Umbalusi experiment farm.
- (3) The Rhodesian railway crossing the Province from Beira to Rhodesia, connecting with the railways from Cape Colony at Bulawayo, whence extends the line crossing the Victoria Falls, and which may eventually have termini at Lobito Bay and Cairo.
- (4) Narrow-gauge railway from Quelimane northward for about 20 miles to Maquival, bringing the Macuse and other rivers into touch with Quelimane.

There is also regular steamship communication by large vessels from and to Europe, and calling at all Cape ports, between Lourenço Marques, Inhambane, Beira, Quelimane and Mozambique, while smaller steamers up to 1500 tons make a regular coastal service along the Province and visiting the above-named ports together with Chai-chai, Bazaruto, Bartholomew Dias, Chinde, Tjunga (Bajon), Angoche and Porto Amelia, and there is occasional service up the Zambesi, as well as to Marracuene and Bella-vista, and up the Maputa River, and elsewhere as required. The harbours are in most cases good; the entrance is in some cases difficult owing to sand-bars. Communication by sea is thus as good in the Province of Mozambique as it is in Portugal, or in England, but the frequency of the voyages depends to some extent on contracts and on the trade of the ports visited.

Beyond the ports mentioned navigation is carried on by boats and barges for a long distance up several of the rivers, as well as up rivers not open to the sea, while even the small streams, so long as they are not too rapid, are used by native dug-out boats, for the transport of produce and passengers.

Apart from the district of Lourenço Marques there are few wagons, trollies, carts or carriages in the Province; Lourenço Marques has a good electric tram service; the other towns have tram service by native power; mules and donkeys are the means of getting about where these exist and are fit for the roads; and, where these are unfit, the Mashila, viz. a hammock slung on a bamboo and carried on the shoulders of four natives is used. This latter contrivance is the only means of passenger transport in Zambesia and northward, and as the bearers keep up a kind of trot 30 to 35 miles a day can be covered, two or three relays of natives taking turn at carrying, but all keeping in company to do so as required.

The native baggage carriers or croquedorras also do a similar distance, carrying from 60 to 100 lbs. each, and walk or trot at a pace exceeding that which a white man can keep up, and they can do so day after day for a week or two, living only on manioc (cassiva) obtained as they go along.

By the above various means most parts of the Province can be travelled without difficulty, but the cost of transport of produce is still the main impediment to the rapid development of many districts, especially where outlying places are concerned, and several development lines are meantime under consideration, one of which, from Chai-chai to Inhambane, would be of immense value, going through a most productive country, and would also connect the Inharreme river, making it a serviceable water-way for some fifty miles in another direction.

**Agriculture** cannot be said to have made much progress until within the past decade or two, and even now there is room for improvement. In the neighbourhood of Lourenço Marques one would have expected the near proximity of the Transvaal markets to have encouraged the culture of tender fruits, winter vegetables and flowers, and the various other products which can be grown on the coast but cannot be grown inland, at least at the same season. But with the exception of Dr. Saldanha's fine farm at the Umbalusi it may be said that nothing of this kind is done, indeed the local market is badly supplied and often has to draw its supplies of produce from Natal or the Transvaal, which could easily be produced locally. It is also exceedingly surprising that the grand alluvial valley of the Limpopo should have remained so long undeveloped, suited as it is for the production of sugar, lucern, grain, &c., as also the ranching and agricultural lands on the Incomati and upper Limpopo.



In the neighbourhood of Inhambane sugar and cocoa-nut production are making good progress, a factory is at work making cassiva flour, and ceara cultivation has been attempted, but the export of oil-nuts and grain has been falling off, mostly through the prosperity of the natives in other directions.

Thence northward, a huge tract of country 60,000 square miles in extent is in the hands of the Mozambique Company, administered under a Royal Charter granted by His Majesty the King of Portugal in the year 1891. This is said to be the only Chartered Company now extant governing territory which had been under the direct administration of a European Power previous to its charter being granted. The Territories of Manica and Sofala are its area; the city of Beira is its capital and port; both administration and development are being actively carried on; and in addition to its own efforts it has several subsidiary companies at work, mostly on British capital, producing sugar, sisal fibre, rubber, &c.

In the Districts of Quelimane, Tete and Mozambique the Government retains the administration and has immense areas still in its own hands, but there are also various companies doing most valuable development work in a most thorough manner. According to the "Anuario de Mozambique," 1908, the position of these for 1907 is stated as follows:—

- (1) Companhia de Zambesia, capital 2,025,000,000 reis (= £400,000), with prazos (estates) as follows:—Magenja-alem-Chire, with 200 hectares virigated, to be increased to 2000; Massingire, with 72,140 coffee trees, 330,000 sisal plants, 3400 cocoa-nut trees, 2000 acres of planted rubber, including large trees of castilloa and heven; Andone Anguaze, with 149,000 bearing cocoa-nut palms, and 225,000 cocoa-nut plants in nursery; and Timbué, for the exploitation of timber only.
- (2) Companhia de Boror, capital 540,000,000 reis (= £110,000), with prazos at Boror, Tirre, Lycungo, Macusse and Nameduro, containing 401,200 cocoa-nuts in bearing, 250,000 ditto in nursery, 240,000 coffee trees, 350,000 rubber trees, 250,000 sisal plants, 16 hectares cotton and 350 hectares sugar.
- (3) Companhia de Luaho, capital 990,000,000 reis (= £200,000), with prazos at Luabo and Marral, containing 66,000 cocoa-nut trees in bearing, 30,000 ditto in nursery, 80,000 rubber trees (Castilloa and Ceara), 660,000 sisal, 90 hectares cotton, and 1290 hectares sugar grown by the subsidiary Marromeu Company.
- (4) Society du Madal, capital 785,000,000 reis (= £150,000), with prazos at Madal, Tangalane-Cheringone, and Mahindo, containing 124,970 cocoa-nut trees, and 100,000 in nursery.
- (5) Companhia do Assucar de Mozambique, capital 1,350,000,000 reis (= £270,000), with prazo at Magenja-aquem-Chire, has 1550 hectares sugar and produced 5000 tons sugar last year.
- (6) Gavicho de Lacerda, at Carungo has 54,000 cocoa-nut palms, and 30,000 ditto in nursery.
- (7) Soutulho Rodrigues, at Inhassunge has 11,600 cocoa-nut palms, and 7000 ditto in nursery.
- (8) Mariano Nazareth, at Pepino and Quelimane do Sal has 37,000 cocoa-nut palms, and 20,000 in nursery.
- (9) Empresa Agricola do Lugella, capital 37,000,000 reis (= £7500), with prazos at Lugella, Lomue, and Milange, has large nurseries of cocoa-nuts.
- (10) Messrs. Helliard & Hamburger, at Nhamacurra, produce 1000 tons of sugar per annum.

The northern part of the Province, extending from the Indian Ocean to Lake Nyassa, and separated from German East Africa by the Rovuma River, is another huge tract of country in the hands of the Nyassa Company, from which mangrove bark has been exported in some quantity, and in which a railway is projected for 250 miles westward from Port Amelia.

**Agricultural encouragement.** During 1908, and largely owing to the agricultural activity of Dr. Saldanha and the encouragement of Governor-General Major Frere d' Andrade, the Government organised an Agricultural Department, under a Director of Agriculture, assisted by a Veterinary Surgeon, an Entomologist, and a small office staff. Restrictions on the movement of cattle, rendered necessary by East Coast Fever, Plant import regulations, the distribution of seeds of high quality, grains, &c., and various other measures, have resulted, and the Department has in hand the arrangement and equipment of an experiment farm at Umbelusi which will probably do more to wake up the Province as to its agricultural potentialities than any other means yet tried. The scientific mission, of which this volume is one result, and in which the various members of the Departmental staff, and others, took part, was one of the first acts of the Department, which, if regularly supported by sufficient funds, will revolutionise the Agriculture of the Province, render the Province self-supplying in practically every article of domestic consumption—as it easily can be—and also bring in a huge revenue from the export of agricultural and forestal products. Meantime that export is very small. In the Mozambique Budget for the year ending June 30th, 1909, the principal items of revenue estimated are hut-tax £272,000, customs £224,000, railways £250,000, and native emigration £57,000; while among the items of expenditure are the military service £214,000, railways and harbour £146,000, colonial expenditure in Lisbon £17,200, passages of officials to and from the Province £26,000, Agricultural Department £8200, experimental farms £5200, fencing and stock £6000, Catembe graving dock £8000, dredging Polana and the wharf wall £40,000, and railway rolling stock £17,000. These figures speak for themselves as to the position of internal development in the Province.

## CHAPTER II.

### The Forests.

THE forests of the Province of Mozambique are bounded only by the boundaries of the Province itself, that is to say, the whole Province is one forest, except in so far as fire and the axe have interfered with it. But its value as forest varies immensely, and it will be necessary to consider the localities separately.

- (1) The District of Lourenço Marques, including the circumscriptions of Maputo, Marracuene, Sabie, Manhica, and Magude, together with the upper portion of Gaza (Guija).—Throughout the whole of this area thorn-veld prevails, composed in great part of Leguminous trees scattered far enough apart to allow an abundance of grass to grow underneath and still close enough to maintain an open canopy throughout. The trees are usually of no great height, 30 to 50 feet being the average except along the streams, while in diameter 10 to 15 inches is the average. As the grass is burned every year, clean unbranched stems prevail, usually straight and without taper for 10 to 15 feet, but seldom available for technical purposes in 20 feet lengths, and usually with a rounded or more or less bushy crown. Many of these trees are of extreme hardness, and have black or red heartwood; so far as a local demand exists for hardwood, it is easily met with good material of good kinds. A considerable industry formerly existed along the main line of railway in sending poles of several species of *Acacia*, under the name *Mkai*, to Johannesburg, for use in the mines, where the strength and durability gave this a special value; but the available material within easy distance of the railway has been practically worked out, and now that the Swaziland railway brings other areas within reach, the Government has prohibited the felling of this timber until such time as arrangements are completed for felling on license. Of course here as elsewhere many trees of larger size occur, mixed among these hardwoods, but usually they are exceedingly soft, such as *Ficus* or *Commiphora*, and withstand the fire through their sappy nature, but are of low technical value. The number of species of timber trees is very large, the *Acacias* are more or less gregarious, but other kinds occur in very scattered fashion, and of several species I only saw single specimens. The largest trees are either too soft or too hard to be worth working under present conditions, and no timber industry exists on the flats though valuable timber is there in abundance. In Lourenço Marques only one wagon-maker is at work, mostly on repairs, and his demand for local timber is very limited.

The species composing this thorn-veld are mostly different from those which occur in Natal and Zululand, the line of division being where the sandy flats begin, north of the Umfolozi.

On the Swazi border where an altitude of 2000 feet is reached the tree-flora is very different. Trees are not abundant or large except in the Kloofs, *Acacia* is less abundant, *Combretum* more abundant, and many trees of the Kaffrarian and Natal forests appear, such as *Podocarpus*, *Toddalia*, *Olea*, *Ptero-celastrus*, &c. *Cussonia*, which is absent below, is still scarce, and a *Ficus* takes its place as the last survivor on dry rock. Curiously enough, I found dense gregarious thickets, including very large trees, of a species (*Weihea?* *subpeltata*) which otherwise I only had from near Mozambique. On the top of the Lebombo range, at Estatuene, a Dutch wagon-maker, Mr. H. Du-pont, carries on an extensive business, doing most of the wagon work for Swaziland, all with local material, of which he held a considerable stock, well seasoned, and I considered the information received from him, supported as it was by wagons, timber, furniture and building material in his possession, to be most valuable, and most of it was corroborated by Mr. Stem, of Swaziland, who happened to be living below the Lebombo when I was there.

On the Transvaal border most of the kinds are common to Gaza and to the Eastern Transvaal.

Near the coast a belt of litoral kinds on the dunes and sandy plains corresponds very closely with the flora of similar positions in Natal, while on the muddy shore the more or less cosmopolitan mangroves of similar latitudes abound. *Trichilia* and *Anacardium* are common on the sandy flats, as also are two species of *Strychnos* and one of *Garcinia*, together with the rubber-yielding *Landolphia*, *Kirkii*, and latex-yielding *Ficus* species.

Several floras thus meet within the district, which consequently has a very large number of ligneous species, and a large number of kinds yielding valuable timber, but seldom dense forest or large quantity of one kind, except the *Acacias*.

- (2) The lower portion of Gaza and the district of Inhambane.—History has left its mark here. Closely inhabited by a most industrious agricultural population, who know the value of fresh forest areas for agricultural work, little of the original forest now remains, and present or past cultivation shows everywhere. Large as must be the area which has been cultivated and then abandoned in the ordinary course, there is probably a larger area which relapsed about twelve years ago during and after Gungunhama's raid. Fortunately the bush reasserts itself if given an opportunity, and that abandoned during the raid is now a thriving young dense forest, 12 to 20 feet high and with stems six to nine inches diameter. Most of the area under consideration may be described as a Tzontzo forest (*Brachystegia*), this tree being the predominant



species in regeneration and probably much more abundant now than before cultivation began. But unlike the majority of assertive weeds, this tree as it increases in quantity increases the value of the forest, alike from the native's point of view and from that of the European utilitarian. This tree is absent from the Lourenço Marques forests, and is only one factor in a crowd in the Quelimane forests, but in Gaza and M'Chopes there are large areas where there is nothing else, where cultivation has been practised at some former time.

But the native, in clearing for cultivation gives this no quarter. It is true that he acts on a list of reserved trees—reserved by native traditional practice, and likely always to remain so—but the native's choice is exceedingly practical; if a tree does not yield food or drink it has to go. *Trichilia* (Mafurreira) and *Anacardium* (Cashew) are reserved everywhere, Mango and Orange where they occur, several creepers under the names *n-kaloga*, *tinta*, *shangala*, &c. from whose fruits wine is made are allowed to form suberect bushes in the cultivated fields, and pine-apple borders every field—reserved for the sake of the spirit distilled from its fruit rather than for the fruit itself. A *Ficus* is also reserved, or even cultivated, for the cloth made from its bark, but a timber tree is hardly required in the domestic economy of the native, and consequently is cleared as a weed. Even such a useful tree to him as the *Brachystegia* is cleared without hesitation, since the uncultivated areas contain it in abundance.

The general character of the aboriginal forest in this locality is of a dense evergreen nature, rather undergrown as might be expected from the light sandy soil on which it has to develop, but containing many valuable species not frequent elsewhere. In a few spots, especially coastward, one might have been tempted by the vegetation to believe he was in Natal, Natal species forming the jungle almost to the exclusion of more tropical kinds, but the bare sandy soil, the absence of ferns, lichens or mosses, and the intrusion of *Brachystegia* and *Dracaena* were distinctly non-Natalian. In the neighbourhood of certain lakes in Manjacaze and Zavalla, on sour and rather wet sand, *Eugenia cordata* was the only tree, and an *Erica* the only shrub. As Inhambane is approached the Baobab (first seen at Inharrime), makes a frequent appearance, and near the rivers cocoa-nut palms become abundant in cultivation, along with fine specimens of the Tamarind and other exotic leguminous trees, and the Jujube, which, however, was not noticed wild here. Inhambane coffee is a natural product of the forest, and makes an early regrowth after fire.

On the tidal mud of the estuaries extra-tropical mangroves are abundant, but being mostly *Avicennia* are of little value. *Landolphia Kirkii* is abundant in many parts of the district, and the Banyan traders do a considerable business in buying its rubber from the natives; rubber or gutta is probably also obtainable from the various other Apocynaceous trees, shrubs and creepers present, as also from a species of *Mimusops*; the scented timber of *Excaecaria* may also form an article of commerce, and the seeds of *Trichilia* do so at present, for the oil obtained therefrom. An Euphorbiaceous tree seen only along the Inharrime River gave an enormous flow of thin latex, which may be found of value. This district, despite the enormous extent of present and past cultivation, holds a high value of forest products, and only requires a railway to make these available.

- (3) Manica and Sofala, being administered by the Companhia de Mozambique, did not fall within the scope of my investigations, and I only saw the bush immediately surrounding the three ports, Bazaruto Island, Bartholomew Dias, and Beira. I had, however, the good fortune to meet Mr. W. H. Johnson, F.L.S., Director of Agriculture to the Companhia, and who has also the forestry in charge, from whom I learned that except what has been taken up for cultivation, the whole territory is practically open forest, though in many favourable localities it becomes more or less dense. The species present are perhaps in accordance with the soil and rock formation, and also the climate more or less identical with those of Inhambane as far north as Beira, whence they correspond more with those found on the Zambesi and northward. In the forests the Company is mainly interested in the collection of rubber, of which over 800 tons have been exported during the past 14 years, some of the forests being worked by private enterprise, and some by the Company itself. The rubber is mostly the product of *Landolphia Kirkii*, but *Landolphia Buchanani*, *Landolphia florida* and *Mascarenhasia elastica* probably also yield a quota, while *Diplorhynchus mossambicensis* and a *Ficus* are also latex-yielders. *Dalbergia melanoxylon* is said to be one of the best timbers, but was not seen by me. As seen from on board ship the whole coast is composed of sandy dunes, on which *Casuarina* is the prominent and often the only tree, standing erect and tall even when solitary in the most exposed situations, and making more or less open bush where gregarious. In the estuaries mangroves abound, including the more tropical kinds, but the industry in mangrove bark is limited, mostly through the scarcity of the better kinds.

*Diospyros*, *Sophora*, *Suriana*, *Elaeodendron*, &c., constitutes a very distinct littoral bush flora behind the mangroves at Bartholomew Dias, which was not seen elsewhere.

- (4) Quelimane, and northward and westward.—Although the immediate neighbourhood of Quelimane presents little of interest in the nature of natural forest, consisting entirely of mud flats cleared of the original bush and now under cocoa-nuts, rice or manioc, in accordance with its dryness, the back country consists of unbroken forest of high technical value and of much botanical interest. It is mostly evergreen and broad leaved, dense enough to yield straight clean timber, open and level enough to be easily worked, and on sufficiently good soil to yield good crops where it is cleared.

Rubber abounds, both *Landolphia Kirkii* and *Mascarenhasia elastica* being present in quantity, though the amount collected is meantime small. The valuable imbiló timber (*Pterocarpus*) is present everywhere, though of special quality in the fine valley known as the Raraga Forest; Magundo (*Milicia*) is seldom absent and often of enormous size; several hardwoods known rather confusedly as pau-ferro, naquada, and pangira are abundant; *Brachystegia*, *Parkia*, *Bauhinia* and *Cordyla* are common and of considerable size, while the Tamarind and the Mango (probably introduced long ago) are scattered throughout the forests in what now appears indigenous growth and of enormous size, and the exotic *Eriodendron* (Kapok) and *Bombax* are rapidly taking similar positions.

Several Euphorbiaceous trees under the common name Umtela are common and of timber value, while *Combretum* and *Terminalia* species are also valuable hardwoods of large size.

The scented muconite (*Excoecaria*) is local but very fine, *Mugonha* (*Adina*) makes a fine tree and valuable timber along the streams, *Khaya* and *Sorindeia* form very large trees near water, and the Flat-crown (*Albizzia fastigiata*), now worked scarce in Natal, is abundant and of fine form, without damage. *Anacardium* (Canjew) is the most common tree in abandoned land formerly cultivated; *Sclerocarya* is its frequent companion; the Orange is not uncommon where a kraal has at some time existed, and lentils (*Ervum lens*) in a semi-naturalised condition abound.

The forest varies much in density; the valleys along several rivers such as the Raraga and the Lecungo contain very fine material in enormous quantity; the higher ground is of lighter material, say  $2\frac{1}{2}$  to 3 decametres diameter and 20 metres height, equally spaced at about 7 metres distance. This latter material is the product of light sandy soil, and would never grow larger under present circumstances; there is no undergrowth and no dead material standing or lying about; presumably the white ants (*Mchai*) speedily destroy all soft dead wood, though several of the hardwoods are proof against white ants and have remained intact in buildings for many years. The absence of Baobab and the scarcity of *Trichilia emetica* in the forests of Magenja da Costa is notable.

The Companhia de Zambesia (Manager, Capt. S. Munish) is opening up a timber business in its Messingire Forests, which extend north of Mopea and along the Shire River; the Luaba Co. (Manager, Senhor Bon Souza) is working in the extensive Marral Forests nearer Quelimane and building boats, lighters, &c.; the Boror Co. (Manager, Count Stucki) utilises the timber it clears for plantation work, in so far as demand exists, as also does the Madal Co. (Manager, Sr. Bouvay).

Taking this region as a whole, there are many thousands of square miles of actual forest of high quality, still waiting the advent of the lumberman.

The districts of Tete and Mozambique add considerably to the number of species of trees, and consist for the most part of forest similar to that in Quelimane, but in the tidal mud near the coast the amount of workable mangrove is considerably greater. The Northern district, worked by the Companhia do Nyassa, extending as it does from the Indian Ocean to Lake Nyassa, naturally introduces many additional species, of which only those along the Rovuma River on the northern boundary are well known. According to the "Anuario de Mozambique," 1908, the products of the district are:—Earthnuts, sesame, caou and chouc (*Ficus* and Euphorbiaceae), copal, gum, ebony, cocoa-nut, wax, vegetable wax (*Myristica ocuba*), "arroz," mapira (Kafir-corn), mealies, anil, sugar, pimento, ricinus (castor-oil), tobacco, coffee, cloves (= cravo), baobab, &c., as also these timbers:—Sandal, Teak, Pau-ferro, Mogno (*Khaya*), Caju (*Anacardium*), &c.

My own mission did not include the Nyassa Company's area nor the districts of Mozambique and Tete, but a considerable amount of information has been obtained which is included here in regard to the species concerned.

## CHAPTER III.

### Forest Flora.

Localities are separated into *Tropical*, including all north of Inhambane, and *Extra-Tropical*, including all south of Inhambane. The numbers representing languages are explained on page ix. Characters given refer only to the local ligneous flora so far as known, and may not apply to herbaceous or foreign species belonging to the same order or genus.

### Synoptical and Specific Descriptions.

#### CLASS I.—DICOTYLEDONES.

Embryo with 2 cotyledons. Primary root fully developed. Wood in concentric circles formed by successive additions under the bark. Leaves usually with netted venation. Flowers usually 4 or 5-merous, or some multiple of these, seldom 3-merous.

With the exception of the Palms, Bamboos, dendroid Liliacæ, and Pandanus, this class includes all trees dealt with in this Flora.

#### SERIES I.—THALAMIFLORÆ.

Calyx and corolla usually both present. Calyx free from the ovary. Petals free (*i.e., not united among themselves*). Petals and stamens hypogynous (*i.e., springing directly from the receptacle*). Receptacle flat, or variously raised or depressed. Ovary superior. (*The few exceptions to these characters will be noted in connection with the plants concerned. Series I. and II. merge gradually and indistinguishably into one another.*)

#### THALAMIFLORÆ. GROUP I.

Petals and stamens rising directly from the receptacle, close to the pistil. Leaves simple, or in Sterculiacæ sometimes digitate, and in Capparidæ sometimes 3-foliate. (Exceptions :—Scolopia, Dovyalis.)

#### FAMILY I.—ANONACEÆ.

Flowers hermaphrodite. Sepals 3; petals 3 or 6; stamens numerous, indefinite; carpels several, separate. Seeds with ruminated albumen. Leaves simple, alternate, exstipulate. A tropical or sub-tropical family, including trees, shrubs, climbers and herbs, several yielding edible fruits. There are 14 African genera.

1. **ANONA.** Sepals 3, valvate in aestivation. Petals 3; stamens indefinite; carpels indefinite; ovaries connate into a cordate many-seeded fruit, each ovary having 1 solitary erect ovule. Trees with simple alternate exstipulate leaves, common in cultivation as fruit trees in tropical and sub-tropical countries, the Custard-apple, the Cherimoya, the Sweet-sop and the Sour-sop being among the fruits produced. These fruits, under the general Portuguese name Ata, were seen in all the towns of the Province and in such outlying localities as Inharrime and Arenga (Magenja da Costa).

**A. senegalensis**, Pers. *Vernacular names*—1, 2, Anona; 4, 5, 6, Trofa or Rofa; 10, 11, Moebe or Wiabe. A shrub, large shrub or small tree, frequent in the sandy soils throughout the Province wherever the bush is not dense, most frequent in open spaces, and almost absent from alluvial mud soils and from dense forest. Leaves elliptic from a cordate or rounded base 10-15 c.m. long, 3-10 c.m. wide, entire, rounded at the apex, sub-coriaceous, green and pubescent on the upper, lighter and densely pubescent on the under surface, where the numerous side veins and connecting veinlets are in relief. Petiole 2 c.m. long, pubescent as also is the young wood. Flowers axillary, solitary, on peduncles 1-3 c.m. long. Fruit pendent, obliquely cordate, warted, greenish yellow, 3-6 c.m. long, 3-5 c.m. wide, eaten by the natives but not equal to the cultivated kinds mentioned above. Occurs throughout Tropical Africa and here extends beyond the tropic.

PLATE I. A. 1, Leaf branch; 2, Fruit; 3, Seed.



It is mentioned in "Flora of Tropical Africa" that Dr. Kirk sent specimens in fruit from the Rovuma and Zambesi districts of what may prove a new species of *Anona*. Beyond larger size from growing in more tropical forest I found no difference between the northern and southern specimens, nor did I see any other wild species.

2. **POPOWIA.** Scandent shrubs having:—Sepals 3, valvate; petals 6, in 2 rows, valvate, very small. Stamens extrorse, in 3 bundles of about 5 each, the bundles alternating with the inner petals. Carpels many, unconnected; ovule solitary, erect. Berries many from each flower, stalked, indehiscent. The only species represented is *P. caffra*, Harv. & Sond., a straggling woody creeper having oblong or obovate leaves 10 c.m. long, 3 c.m. wide, glaucous on the under surface, and about 10 oval red edible berries 1.15 c.m. long on each receptacle. See "Forests and Forest Flora of Cape Colony," Plate XVI. fig. 4. Noted but not frequent in the extra-tropical forests around Lourenço Marques, and brought to me in the Tropical Maganja da Costa Forest by a native doctor, under the name *Viriga* (10), as a medicine; see Chap. V. It occurs also in the eastern part of Cape Colony and Natal.
3. **UVARIA.** Scandent shrubs having:—Sepals 3 valvate; petals 6 in 2 rows, imbricate in aestivation; stamens and carpels numerous, separate; ovules several; fruit carpels several or many, several-seeded or 1-seeded by abortion, more or less edible. Stem-sap not milky. To this and the other scandent genera of this family belong the several species which are known indiscriminately to the natives throughout the Province under these vernacular names, viz.:—4 to 8, Tete, Tinta, Shangala, Lo-komela, in-chin-chaio; 10, n-kaloga; 13, Mazwenda; 15, Shin-tin-lan, and from the fruits of which a liquor is brewed, for which purpose these plants are protected where they occur in cultivated fields, where when left without support they form sub-erect bushes with trailing shoots. The leaves are simple, widely lanceolate to oval-oblong, 7 to 10 c.m. long, and the fruits purplish or yellowish, 2-3 c.m. long, somewhat oblique, and from 3 to 10 on 1 receptacle, which is usually opposite a leaf. The natives consider the fruits of all edible. Pubescence, where present, is mostly stellate. The species are:—  
*U. caffra*, E. M. Young parts pubescent; leaves widely lanceolate to oblong-pointed, glabrous and shining on both surfaces, 5-10 c.m. long; peduncles 1-flowered; fruit-carpels stalked, nearly globose, 2 c.m. long. Abundant in extra-tropical districts, at Lourenço Marques, Chai-chai, Zavalla, and Inhambane. This or a similar species also occurs in the tropical forests at Arenga, Bajon, Nhamacurre, &c. See "Natal Plants," Plate 241.  
*U. acuminata*, Oliv. Young parts pubescent; leaves oval-oblong from a sub-cordate base, pale and stellate-pubescent below, 5-10 c.m. long. Sepals connate below; fruit-carpels nearly globose, 1.5 c.m. long, stalked. Rovuma River, Dr. Kirk, and Madagascar.
4. **CLEISTOCHLAMYS.** Sepals connate in bud; petals 6, the 3 inner rather smaller, and imbricate in aestivation. Stamens many; carpels 6-8, free; ovules solitary erect. Carpels oblong, stalked. Monotypic.  
*C. Kirkii*, Oliv. A glabrous shrub, having shortly petioled oblong leaves 4-10 c.m. long; small axillary sessile flowers; and black, edible, 1-seeded oblong fruit-carpels 2 c.m. long, 1 c.m. diam.; found near Tete and Senna by Dr. Kirk.
5. **ATRABOTRYS.** Sepals 3, free; petals 6, valvate in aestivation; stamens numerous; carpels indefinite; ovules in pairs, erect, fruit-carpels longer than wide, 1-2 seeded, edible.  
*A. brachypetala*, Benth. A scandent shrub, pubescent on its young parts, glabrescent afterwards. Leaves oval to obovate, 6-10 c.m. long; peduncles flattened, woody, sharply recurved, 3 c.m. long, 6-10 flowered. Fruit-carpels purple, edible, used to make liquor. Common throughout the Province. For vernacular names see under *Uvaria*.
6. **UNONA.** Sepals 3, free, valvate; petals 6, the inner 3 shorter, valvate in aestivation; stamens and carpels numerous, free; ovules 2 or more; fruit-carpels stalked, more or less constricted between the seeds. There are 6 or more Tropical African species.  
*U. obovata*, Benth. A small tree found near Moramballa, Zambesia, by Dr. Kirk, having obovate leaves 6-12 c.m. long with sub-cordate base and short petiole, 1-flowered peduncles opposite leaves, and several 1-3 seeded fruit-carpels, glabrous and shortly stalked.
7. **MONODORA.** Sepals 3; petals 6, valvate, wavy, connate at the base, the 3 inner smaller; stamens indefinite; ovary syncarpous, 1-celled, with numerous parietal ovules. Fruit large, globose, many-seeded. A Tropical African genus of about 6 species of trees, having flowers 5-10 c.m. across and globose or ovoid fruits 10-15 c.m. long.  
*M. stenophylla*, Oliv. A shrub or small tree from the neighbourhood of Shire and Lake Nyassa, having yellow flowers, the outer petals 4-5 c.m. long; obovate leaves and ovoid fruits.

FAMILY II.—MENISPERMACEÆ.

Flowers diœcious; sepals 6, in 2 series; petals 6; stamens in male flower 6, opposite the petals; carpels in female flower 3, free; ovules solitary; fruit carpels drupaceous. Climbing shrubs, with alternate exstipulate lobed or entire leaves and minute flowers in racemes or panicles. This Family is introduced here on account of the genus *JATEORHIZA*, the roots of *J. Columba*, Miers, yielding the Columba root of commerce, which has tonic properties and of which samples from the Companhia de Mozambique fetched a price of 22/- per 50 kilos in Europe. The plant is a hispid creeper, with 3-5 lobed leaves 15-20 c.m. across or larger, and flowers in racemes or racemose panicles 6-12 inches long, and avoid drupes 1.5 to 2 c.m. long in clusters.

FAMILY III.—CAPPARIDACEÆ.

Hermaphrodite. Sepals 4; petals 4 or 0. Torus sometimes with an appendix. Stamens 8 or many; ovary usually on a long gynophore, 1-celled or spuriously several-celled; ovules many, parietal. Fruit various, usually baccate and stalked by the gynophore, usually indehiscent and several or many-seeded. Trees, shrubs, or scandent. Leaves alternate, simple or 3-foliate with entire leaflets. Inflorescence various; stamens usually conspicuous.

8. **THYLACHIUM**. Calyx opening by transverse dehiscence, the top falling away. Petals absent; stamens numerous, free, on a short torus. Ovary 1-celled or spuriously several-celled on a long gynophore; placentas several; ovules many, seeds many.

**T. Africanum**, Lour. A bush or small tree from the Shire River, having simple or 3-foliate leaves, the leaflets 3-10 c.m. long, few-flowered corymbs of flowers about an inch in diameter, and the ovary spuriously 5-celled with parietal ovules.

9. **MÆRUA**. Sepals 4, connate below in a tube, the lobes deciduous; petals 4, very small or absent; stamens many, on a columnar torus; ovary on a long gynophore, 1-celled or spuriously 2-celled, ovules numerous; fruit various; leaves simple or 3-foliate; inflorescence various. Trees and shrubs, distributed over Africa and southern Asia; none of the local species reach timber size except very occasionally.

**N. caffra**, Sim. ("Forest Flora of Cape Colony," 122, Plate IX. fig. 1.) *Vern. name*—4, Shidwandwane. Shrub or small tree, evergreen; leaves mostly 3-foliate, leaflets oblong-obovate, 3-5 c.m. long; flowers in corymbs of 5-10, terminal or terminal on short side branches; calyx-tube 1.5 to 2 c.m. long, sepals 2-3 c.m. long, green; petals absent; stamens about 30 conspicuous, with white filaments 4 c.m. long, folded in bud, and rising from a torus as long as the calyx-tube. Gynophore 4 c.m. long; stigma discoid; berry oblong-ovoid 4 c.m. long, leathery. Frequent at Umbelusi and throughout Lourenço Marques district. Occurs also in Cape Colony.

**M. nervosa**, Oliv. (See "Natal Plants," Plate 260.) *Vern. name*—6, Ibula. Shrub or small tree similar to *M. caffra*, but with more numerous and smaller flowers and with small greenish petals inserted at the summit of the calyx-tube. Fruit 1.5 c.m. long on a gynophore 2 to 3 c.m. long. Tropical Zambesia. Extra-tropical Lourenço Marques and Inhambane. Occurs also in Natal.

**M. acuminata**, Oliv. Leaves 3-foliate, or the upper simple; leaflets ovate or ovate-lanceolate, glabrous, mucronate central leaflet 5-7 c.m. long, others shorter, all on slender petiolules 40-50 m.m. long. Flowers in axillary corymbose racemes. Petals absent; ovary oval, 1-celled, with 2 placentas each with about 10 ovules in 2 rows. Rovuma River.

I have a specimen from Lourenço Marques which differs only in having petals and smaller leaves; a slender shrub.

**M. racemosa**. (New species)\* Shrub, glabrous throughout. Leaves 3-foliate, on petioles 5 c.m. long; leaflets widely lanceolate 5 c.m. long, on short petiolules. Inflorescence axillary, racemose, the racemes 15-20 c.m. long many-flowered, peduncles 1.5 c.m. long, slender, jointed at the base, solitary from the axil of a short acute bract. Calyx-tube 2.5 m.m. long; sepals 5 m.m. long, petals 3 m.m. long, obovate, clawed. Torus as long as the calyx-tube, stamens about 16, 1 c.m. long, gynophore 2 c.m. long; fruit coriaceous, 2 c.m. long, globose at the middle, slender at each end. Lourenço Marques. Sim 6388.

\* *Mærua racemosa*. (Nov. sp.) Frutex glaber, foliis trifoliatis, petiolis 5 c.m. longis; foliolis late lanceolatis, 5 c.m. longis, petiolo brevi; inflorescentiis axillaribus, multifloris, racemosis, 10-20 c.m. longis; pedunculis 1.5 c.m. longis tenuibus, ad basim articulatis, bractea brevi acuta; calycis tubo 2.5 m.m. longo; sepalis 5 m.m. longis; petalis 3 m.m. longis, obovatis, unguiculatis; toro calycis tubo æquilongo; staminibus circa 16, 1 c.m. longis; gynophorio 2 c.m. longo; fructu coriaceo, 2 c.m. longo, medio globoso. Lourenço Marques. Sim 6388.

- M. floribunda*. (New species.)<sup>1</sup> Shrub or small tree, glabrous throughout. Leaves 3-foliate on petioles 2 c.m. long; leaflets lanceolate, 5 c.m. long, shortly petiolulate. Inflorescence terminal and on upper branchlets forming together a many-flowered panicle 15 c.m. long. Calyx-tube 2 m.m. long, slender; sepals 5 m.m. long, very concave, acute, with ciliate margins; petals minute, wide, pointed; torus as long as the calyx-tube; stamens included; filaments 2 m.m. long, anthers as long; pistil not exceeding the stamens. Fruit unknown. Lourenzo Marques. Sim 5044.
- M. angolensis*, D. C. Shrub or small tree. Leaves simple, lanceolate to ovate, glabrous, 3-6 c.m. long; petioles 2-3 c.m. long. Flowers in leafy corymbose racemes or axillary. Calyx-tube shorter than the lobes; corona toothed; petals absent; torus as long as the calyx-tube; ovary linear; fruit beaded, 5-15 c.m. long, stalked. Occurs occasionally from Shire to Natal, also in Abyssinia and West Africa.
- M. pedunculosa*, Sim. ("Forest Flora of Cape Colony," 122.) *Vern. name*—13, Umpunziso. Shrub or small tree. Leaves simple, lanceolate to ovate, very variable, 5-6 c.m. long. Flowers in axillary racemes, sometimes forming together a terminal panicle. Calyx-tube 25 m.m. long, not toothed, sepals 1 c.m. long, 4 or 5; petals absent; stamens numerous, 1.5 c.m. long; ovary ovoid, stalked rather exceeding the stamens, 1-celled, with 4-5 parietal ovules on 1 side. Lebombo Range, also in Cape Colony, Natal and Transvaal. In Cape Colony the large roots are eaten by the natives when food is scarce.
10. *COURBONIA*. Sepals 3, valvate, very shortly tubular at the base with a toothed disc-margin. Petals absent. Stamens numerous on a short torus; ovary slender, tapering to each end; ovules 2 on each placenta; ovary globose 1-few seeded. A Tropical African genus of 2 species.
- C. decumbens*, A. Brongn. A glabrous, glaucous shrub from Zambesia and Abyssinia. Leaves ovate or elliptical 2-4 c.m. long, shortly petiolate. Flowers axillary, solitary. Fruit globose, 2-3 c.m. diameter on a gynophore 2-3 c.m. long.
11. *EUADENIA*. Sepals 4. Petals 4, clawed, 2 longer than the others. Stamens 5-7 attached to the lower part of the gynophore; appendix of 5 segments from base of gynophore; ovary 1-celled; ovules numerous, parietal. Glabrous shrubs with trifoliate leaves, one from West Africa and the following species:—
- E. Kirkii*, Oliv. *Vern. name*—10, Morima. A small tree 6-10 metres high. Leaves 3-foliate, leaflets widely lanceolate to oval-acute, 7-10 c.m. long, coriaceous. Fruit coriaceous, gourd-like, 1-celled 15 c.m. long, globose above, 8-10 c.m. diameter, abruptly narrowed into the sub-cylindrical lower half. Seeds numerous, imbedded in pulp, 1 c.m. diameter, globose reniform. Found by Sir J. Kirk at Lupata, found by me in several localities in the Magenja da Costa Forests and also cultivated or at least protected at kraals for the medicinal virtues of its roots. Sim 6001.
12. *BOSCIA*. Sepals 4, free to the base, with an annular disc. Petals absent. Stamens 6-20 without torus; gynophore short; ovary 1-celled with a short style; ovules few. Fruit globose, 1 or few-seeded. Shrubs or small trees with simple entire leaves. 5 Tropical African species.
- B. angustifolia*, Rich. A glabrous shrub or tree; leaves from oval to lanceolate, 3-5 c.m. long, often clustered, shortly petiolate. Flowers greenish, in axillary corymbs or together forming a terminal panicle. Fruit globose, 1-2 c.m. long, 1-few seeded. Zambesia, Nile-land and West Africa.
- B. salicifolia*, Oliv. A large shrub; leaves linear to lanceolate, 5-10 c.m. long; flowers on short axillary racemes. Shire River. "Dr. Kirk states that the knotty root is boiled and eaten on the Shire."
13. *CAPPARIS*. Sepals 4, free or more or less connate, but not forming a tube; petals 4; stamens 8 or numerous, upon a torus; ovary on a long gynophore, 1-celled, ovules many; fruit long stipitate. A widely distributed genus of trees, shrubs or stragglers with simple leaves, and with or without stipular spines. Capers are the pickled flower-buds of several Mediterranean species.
- C. albitrunca*, Burch. *Vern. names*—13, Witgatboom; 15, Goning. A medium sized round-headed tree, with a clean white stem 20-40 c.m. diameter and seldom more than 3 metres long. Leaves oblong or cuneate-oblong, coriaceous, acute, 2-5 c.m. long, with short petioles and minute setaceous stipules but no prickles. Flowers in few-flowered short racemes, or sometimes singly and axillary, small, yellowish, sweetly scented. Stamens 8. Berry globose 1.5 c.m. diameter usually 1-seeded, with a 1-2 c.m. pedicel. Timber not much used. For medicinal and other properties see "Forest Flora of Cape Colony," 123 and Plate X. fig. 1. Frequent in Lourenzo Marques district, Umbelusi and Lebombo. Also seen in M'Chopes, and it occurs more freely in Cape Colony and Natal.
- <sup>1</sup> *Mærua floribunda*. (Nov. sp.) Frutex glaber aut arbor parva, foliis trifoliatis, petiolis 5 c.m. longis; foliolis lanceolatis 5 c.m. longis, petiolis brevibus; inflorescentia apicali, multiflora, paniculata, 15 c.m. longa; calycis tubo 2 m.m. longo, angusto; sepalis 5 m.m. longis profunde concavis, acutis, marginibus ciliatis; petalis minutis, latis, acutis; toro calycis tubo æquilongo; staminibus inclusis, filamentis 2 m.m. longis antheris æquilongis; pistillo staminibus non longiore; fructibus haud visis. Lourenzo Marques. Sim 5044.



My Portuguese specimens all have the calyx pubescent on both sides and are without petals, and with stamens 4-8. If this be constant and not due to the caducous nature of these organs, the tree is an undescribed *Boscia*, but it appears identical otherwise with the Cape plant.

PLATE III. 1, Flowering branch; 2, Flower,  $\times 2$ ; 3, Fruit; 5 Tree, general aspect.

- C. albitrunca**, Burch. var. *parvifolia*. (New var.)<sup>1</sup> *Vern. name*—4, Janjaton. Shrub 1-3 metres high, much branched. Leaves cuneate, pointed, coriaceous, 1-2 c.m. long, numerous, fascicled or on short axillary branchlets, and with slender petiole 2.5 m.m. long. Flower not seen. Fruit globose, densely pubescent, 7 m.m. diameter with gynophore 2.5 m.m. long and penduncle 5 m.m. long, solitary, axillary. Abundant on the Polana, Lourenzo Marques, not seen elsewhere. A pretty evergreen shrub, glabrous except the young branches. Sim 5157.

PLATE III. A. fig. 4.

- C. Kirkii**, Oliv. An unarmed shrub; leaves coriaceous, ovate-oblong, pubescent on under surface, 8-10 c.m. long, 3.5 c.m. wide, with a very short petiole. Flowers in terminal umbels or umbellate corymbs. Stamens indefinite. Gynophore 2.5 c.m. long. Lake Nyassa and upper Shire River.

Various other species of *Capparis* occur hardly worth mention here, among which are *C. rosea*, Oliv., an unarmed shrub with petaloid inner sepals, from Lake Nyassa and Zambesia (= *Petersia rosea*, Kl. in Peters' Mossamb. Bot. 168, t. 30); *C. corymbifera*, a prickly sub-scandent shrub with terminal corymbs of rather conspicuous flowers and globose fruits 3 c.m. in diameter, abundant in extra-tropical districts, *vern. name*—4, Mtongashende; *C. Gueinzii*, Sond. scandent and prickly, frequent in Lourenzo Marques and M'Chopes districts, *vern. names*—4, Chipingo; 6, Chivaca; while other scandent *Capparidaceous* plants are known in Lourenzo Marques district under the *vern. names*, 4, Kindabamis and Dwanedwane.

#### FAMILY IV.—VIOLARIÆ.

Flowers in our only ligneous genus hermaphrodite, regular; sepals 5; petals 5; filaments connate; anthers with a connective produced beyond the cells. Capsule 3-valved, opening loculicidally, few seeded. A widely distributed Family, of which the Pansy and Violet are well-known examples.

14. **RINOREA**. (= *Alsodeia*, Thouars.) Characters as stated for the Family.

**R. elliptica**. (= *Alsodeia elliptica*, Oliv. "Flora of Tropical Africa" I. 108.) A glabrous shrub from the Rovuma River. Leaves elliptical from an obtuse or sub-cordate base, minutely serrulate, 6-9 c.m. long. Flowers in axillary fascicles or very short pubescent racemes; petals not recurved; anthers not exerted.

**R. ardisiaeflora**, Sim. ("Forest Flora of Cape Colony," 125, Plate XV. fig 1.) A tree 3-7 metres high, with hardwood stem 15 c.m. diam. Leaves elliptical, 3-5 c.m. long, serrulate, at first thinly pubescent below. Flowers white 1 c.m. wide, in open axillary racemes. Petals recurved over the sepals; anthers exerted. On the Lebombo Mountains and occurs also in Natal (abundant) and Pondoland, as well as in Angola.

#### FAMILY V.—BIXINÆ.

Flowers regular, usually incomplete or imperfect, often diœcious. Receptacle often a cushion-like disc more or less attached to the calyx, but without torus. Petals present or absent. Stamens hypogynous or sub-perigynous, 9-10 or indefinite. Ovary free, sessile, 1-celled, with 2-5 parietal placentæ, and 1 to many ovules on each. Seeds albuminous; cotyledons large. Leaves simple alternate, usually exstipulate. A large Family of trees and shrubs; several are valuable timber trees, others have edible fruits, and the colouring substance Annatto is from the seed-covering of *Bixa*.

15. **BIXA**. Flowers hermaphrodite. Sepals 5, much imbricated; petals 5, large, imbricate; stamens numerous; ovary 1-celled, with 2 parietal placentas and many ovules. Capsule sub-cordate, bristly, ultimately dehiscent; the seeds coated with red pulp. Monotypic.

**B. Orellana**, Linn. *Vern. names*—1, Annatto; 10, Sofaro. A large shrub or small tree. Leaves alternate, sub-cordate, pointed, entire, 10-15 c.m. long, 3-5 nerved at the base, and with slender petioles 5 c.m. long. Inflorescence terminal, paniculate. Fruit ovoid or sub-cordate, coriaceous, bladdery, pointed, 3-4 c.m. long, covered with stiff spreading bristles and hairs. Said to be indigenous only in Tropical America, but now naturalised freely in the forests of Quelimane and present also in M'Chopes (extra-tropical), in both of which localities it is used by the natives for colouring curry; used elsewhere for colouring cheese, &c.

PLATE II. A. 1, Fruiting branch; 2, Horizontal section of young fruit; 3, Vertical section of same.

<sup>1</sup> *Capparis albitrunca*, Burch. var. *parvifolia* (var. nov.) Frutex 1-3 met. altus ramosissimus, glaber nisi ramis junioribus, sempervirens; foliis cuneatis, acutis, coriaceis, 1-2 c.m. longis, plurimis, fasciculatis aut e ramis brevibus axillaribus ortis, petiolis tenuibus 2.5 m.m. longis; floribus haud visis; fructibus globosis, pubescentia densa tectis, 7 m.m. diam., gynophorio 2.5 m.m., longo, pedunculo 5 m.m. longo, solitario, axillari. Abundat in Polana et Lourenzo Marques. Tab. III. fig. 4. Sim 5157.



16. **ONCOBA**. Flowers more or less polygamous; sepals 3-4, free or coherent below; petals 5-10 or more, often large and showy; stamens numerous, free; ovary 1-celled; ovules numerous on 2-10 parietal placentæ. Fruit dehiscent on indehiscent, 1-celled or spuriously several-celled, many seeded. Trees or shrubs with alternate simple leaves.

**O. spinosa**, Forsk. *Vern. names*—4, 5, 6, Tongwaan and Enchowana. Shrub or tree; sometimes 12 metres high with stem 50 c.m. diam.; more frequently much branched shrub. Branches warty, often bearing axillary spines 3-5 c.m. long; leaves alternate, widely lanceolate, acute, crenate or dentate, somewhat rounded below, and with slender petioles 1-2 c.m. long. Flowers solitary or few, terminal on short side branches. Calyx deeply 4-fid; petals irregular in number, 3 c.m. long; stigma peltate; style 1 c.m. long; fruit globose or slightly depressed, 3-5 c.m. in diameter retaining the pistil which increases to 2.5 c.m. in length. The native name has reference to the practice of ricksha boys using the hard shells as rattles on their ankles, as also do others at dances. Tropical Shire River, Zambesia and Quelimane; extra-tropical Inhambane, M'Chopes and Lourenzo Marques, nowhere plentiful; occurs also in Natal, Nile-land and West Africa.

PLATE II. B. 1, Fruiting Branch; 2, Flower.

**O. Kraussiana**, Planch. *Vern. names*—5, Setchelo; 13, um-namnam. A small unarmed tree or shrub with large white flowers. Leaves oblong, obtuse, entire, glabrous, 5-12 c.m. long. Flowers solitary or 2 or 3 together on short branchlets. Sepals 3; petals 10-12, 5 c.m. long; stamens many, filaments white; fruit globose 2.5 c.m. diameter, stalked. Flowers either staminal or perfect. See "Natal Plants," Plate 72. Lourenzo Marques and M'Chopes; occurs also in Natal.

**O. Petersiana**, Oliv. *Vern. names*—4, 5, 6, Gutani or Magutani. A softly pubescent shrub, 2-8 feet high; leaves obovate or oblong, 8-12 c.m. long; penducles terminal or axillary. Lobes of the stigma subulate. Fruit ovoid, nearly terete, at first pubescent, and separating into numerous narrow valves when ripe; seeds scarlet not bedded in pulp. Tropical Zamhesia; extra-tropical Lourenzo Marques and M'Chopes.

**O. tettensis**, Oliv. *Vern. name*—10, Makakara. A pubescent shrub with obovate or oblong undulate leaves 3-5 c.m. long; flowers axillary; calyx 3-partite; lobes of the stigma minute; fruit ovoid-globose, shortly tomentose, with numerous longitudinal furrows. Tete district, and at Arenga, Magenja da Costa.

**O. Kirkii**, Oliv. A glabrous shrub from Rovuma Bay, with obovate leaves, 7-15 c.m. long; flowers axillary; fruit ovoid, terete, glabrous, shortly pointed.

**O. sulcata**. (New species.)<sup>1</sup> *Vern. name*—10, Nyamo-nyambea. Large shrub, rusty pubescent on young growth. Leaves ovate, oblong or oblong-lanceolate 7-12 c.m. long, 2.5 c.m. wide, acute, usually rounded below, thin, roughly and irregularly toothed, 3-nerved at the base, glabrous or glabrescent except on the veins below; petioles 1-2 c.m. long. Flowers 1-3 together, terminal, the bud in the upper axil continuing the growth. Flowers not seen, but said to yellowish-green. Fruit lanceolate, 6-8 c.m. long, 2 c.m. diameter, deeply furrowed with about 16 ridges meeting in pairs at top and bottom. Seeds round, smooth, brown, 2 m.m. diameter, bedded in pith so apparently in separate cells. Arenga, Magenja da Costa. Sim 5900.

PLATE III. B. 1, Fruiting branch; 2, Section of fruit.

The native name M-kau-kau is given in Magenja to a shrubby Oncoba 2-3 metres high, the flowers of which are eaten in times of scarcity, and which has also a medicinal use, but my specimens insufficient to admit of specific identification.

17. **RAWSONIA**. Flowers hermaphrodite or occasionally polygamous; flowers in short axillary racemes or crowded; sepals, petals and petaloid staminodia all concave, scarious, yellowish, bract-like, somewhat similar, and not indistinct whorls, about 15 in all; the outer ciliate, the inner longer. Stamens about 16, the inner hypogynous, the outer perigynous, opening edgewise. Ovary sessile with a sessile 4-5 lobed stigma; ovules numerous on 4-5 parietal placentæ. Fruit not seen.

**R. lucida**, Harv. & Sond. *Vern. names*—5, Nanga; 13, Umnqai masendi. Small tree. Leaves alternate, coriaceous, glabrous, shining 10-20 c.m. long, 3-4 c.m. wide, oblong-lanceolate, pointed with wavy margins, and sharply serrate, the prickly teeth pointing forward; petiole 1.5 c.m. long, stipules caducous. Racemes 2 c.m. long, about 6-flowered. Whole tree glabrous except the minutely downy sepals. M'Chopes district (extra-tropical); grows also in Natal and Pondoland. See "Forest Flora of Cape Colony," Plate CXLIII.

<sup>1</sup> *Oncoba sulcata* (Sp. nov.). Frutex magnus, partibus junioribus ferrugineo-pubescentibus; foliis ovatis, oblongis aut oblongo-lanceolatis, 7-12 c.m. longis, 2-5 c.m. latis, acutis, tenuibus, irregulariter dentatis, 3-nerviis, glabris aut glabrescentibus nisi nervis paginae inferioris; petiolis 1-2 c.m. longis; inflorescentiis apicalibus, cymosis, 1-3-floris; floribus haud visis; fructibus lanceolatis, 6-8 c.m. longis, 2 c.m. diam., inter costas circa 16 apicem et basim versus binatim junctas profunde sulcatis; seminibus rotundis, levibus, fuscis, 2 m.m. diam. Arenga, Magenja da Costa. Sim 5900. Tab. III. B.

18. **SCOLOPIA**. Flowers hermaphrodite. Disc expanded, filling the calyx-tube; sepals 5, often unequal and with or without minute intermediate teeth representing petals. Stamens indefinite, often numerous, sub-perigynous. Ovary 1-cell, with 2-4 parietal placenta, and few ovules; style single, 2-3 fid at the apex. Berry coriaceous, few-seeded. Leaves alternate, exstipulate.

**S. Zeyheri**, Sim. ("Forest Flora of Cape Colony," 126, Plate II.) *Vern. names*—1, Thorn Pear; 3, Doorn Peer; 4, Hlongoma; 13, Iqumza elinameva. Varying from a coast shrublet to a large timber tree; leaves shortly petiolate, varying exceedingly from nearly round to bluntly lanceolate, and from entire to crenate or dentate, usually blunt, glabrous, and from 5-8 c.m. long, mostly similar on 1 tree, and often bright pink when young. Usually some branches are transformed into spreading, simple or branched, axillary or terminal spines 5-10 c.m. long, which are either leafless or with a few small leaves, and sometimes bearing flowers. Racemes axillary, 1-4 c.m. long, 8-12 flowered. Stamens yellow, forming a rather conspicuous flower. Berry 1-1.5 c.m. diameter, globose, 2-3 seeded. Within the Province I have only seen it either without spines or with simple slender spine 3-5 c.m. long (through which it is easily confused with *Flacourtia* and *Dovyalis*), but in Cape Colony large branched spines often occur. Abundant on the sea-dunes in the extra-tropical part of the Province, but usually of small size; more scarce but larger in the Lebombo and M'Chopes; present also within the tropic at Bazaruto and Bartholemew Dias, and in the Magenja da Costa forests. In Cape Colony it is used as wagon-wood; its extreme hardness renders it difficult to saw but fits it for teeth for mill wheels, and it takes a good polish and is of a dark colour in the heartwood.

PLATE I. B. 1, Fruiting branch; 2, Leaf branch with spines; 3, Fruit; 4, Inflorescence.

19. **FLACOURTIA**. Flowers dioecious, in short, few-flowered terminal racemes, or terminating short lateral shoots; fertile flowers usually solitary. Calyx 4-5 partite, the lobes imbricate and sometimes unequal. Petals absent. Stamens many in male flower, absent in the female. Ovary absent in the male flower; in the female flower 4-8 celled with 2 ovules in each cell; styles 4-8; fruit a berry, the cells in 2 series, one above the other, each with a bony endocarp enclosing a solitary seed.

**F. Ramontchi**, L'Her. *Vern. names*—1, Batoko Plum; 10, Metabira. A glabrous shrub, often armed with sharp axillary spines 2-5 c.m. long. Leaves crenate, 5-8 c.m. long, shortly petiolate, varying from obovate to oblong-elliptical. Fruit a roundish, pulpy, edible berry, 1-2.5 c.m. long with about 10 seeds. Zambesi from Tete downward; Quelimane, and Magenja da Costa.

**F. hirtinscula**, Oliv. *Vern. name*—10, Togoma. A shrub or small tree, densely pubescent on all younger parts, ultimately glabrescent on the upper surface of the leaves, and armed with stout axillary spines 1-2 c.m. long. Leaves roundish, crenate-serrate, 3 c.m. long. Fruit 2 c.m. long, edible. Zambesia and Magenja da Costa.

20. **DOVYALIS**. Flowers dioecious axillary, tufted, or the female flowers solitary. Sepals 5-6, attached to the cushion-like disc, scarcely imbricate in bud. Petals absent. Stamens 10-20 in male flower, none in female; ovary absent in male flower, in the female flower sessile on the raised disc, 1-celled, with intruding placenta which make it appear 2-6 celled; placenta with 1-2 pendulous ovules near the summit; styles as many as the placenta. Berry pulpy, 1-6 seeded, edible. Leaves alternate, exstipulate, simple 3-veined. Axillary spines (abortive branches) are often present.

**D. celastroides**, Sond. (= *rotundifolia*, Thun. & Harv.). *Vern. names*—4, Tinyan-gan-zumbe and Mdinique (also Hlongoma in confusion with *Scolopia*); 12 and 13, Umkokolo; 14, Zuurbesje. A small glabrous, evergreen tree, having sharp axillary spines; obovate, entire, coriaceous, leaves 4 c.m. long, round at the apex and narrowed to the base; small greenish flowers, and ovate-pointed, 2-seeded, scarlet edible fruits 1 c.m. long. Common near the coast and on the sand dunes in extra-tropical districts; it occurs also in Cape Colony, Natal and Transvaal. The fruit is pleasantly acidulous, edible either as dessert or as preserves, or as acid jelly for use with meats. The timber is close grained and hard, but seldom of size enough for technical work. See "Forest Flora of Cape Colony," 132, Plate VII. fig. 1.

PLATE XVII. B. 1, Branch of male tree; 2, Male flower,  $\times 3$ ; 3, Branch of female tree; 4, Mature fruit; 5, Female flower,  $\times 3$ ; Tree, general aspect (much reduced).

**D. caffra**, Sim. ("Forest Flora of Cape Colony," 125, Plate V.) *Vern. names*—1, Kei-apple and Dingaan Apricot; 12 and 13, Umkokolo; 15, L'umbanbane. A small glabrous evergreen tree, having sharp axillary spines; obovate, entire, coriaceous, leaves 4-6 c.m. long, cuneate at the base, rounded or even cordate at the apex; yellowish green axillary flowers, pubescent calyces, and globose yellow fruits 3 c.m. diameter, which are more or less edible, but too high flavoured for most tastes. They are used in preserves, usually mixed with apples to reduce the flavour. The tree is often cultivated as a hedge plant and makes a splendid impenetrable hedge in districts not subject to hard frost. The timber is close-grained and very hard, but seldom of timber size. Occurs on the Lebombo Mountains, as also in Natal and Cape Colony.

Other species of *Dovyalis*, natives of Natal and Cape Colony, probably also occur in Maputa and Lourenzo Marques district, but were not observed.

## FAMILY VI.—POLYGALEÆ.

Flowers irregular, hermaphrodite. Sepals 5, sometimes very unequal. Petals 3, declinate, the lower being the larger and often with a crested lip. Stamens 8, the filaments connected into a tube split along the top and more or less adherent to the petals at the base. Ovary 1-2 celled, with 1 pendulous ovule in each cell. Fruit a capsule or samara. Leaves exstipulate, simple. A considerable Family of herbs and shrubs with a few trees; the flowers usually have a general resemblance to those of Papilionaceæ.

21. **SECURIDACA**. Sepals 5, unequal, 2 larger, petaloid and wing-like; petals 3, the carina galeate. Stamens 8, the split sheath adherent to the base of the petals. Ovary 1-celled with 1 ovule. Fruit a samara. Leaves alternate, entire.

**S. longipedunculata**, Fres. *Vern. names*—4, Tsatsi or Tchatchi; 10, Nakæia; 11, Matungu-nungu. An erect tree 10 metres high and 30-50 c.m. diameter or sometimes a sub-scandent or sub-erect shrub. Leaves alternate, oblong to lanceolate 5-6 c.m. long, 1-2 c.m. wide, usually acute and with slender petiole 1 c.m. long; those on young trees and coppice shoots 10-15 c.m. long, 1-2 c.m. wide, linear lanceolate, tapering from below the middle to both ends. Flowers in short terminal racemes, purple, violet or allied colours; fruit a winged 1-seeded samara 5 c.m. long, 2 c.m. wide. Frequent in the tropical forest at Magenja da Costa, Nhamacurra and Quelimane, usually upon ant heaps, recorded also from Rovuma and Manganya Hills; less frequent in extra-tropical districts but present in Lourenço Marques, Maputa (Lebombo), and M'Chopes. Grows also in Nile-land and West Africa. Used for timber in Magenja. The bark yields the Buaze fibre of Zambesia, and the natives use a decoction of the fruit as an eye lotion.

PLATE V. A. 1, Flowering branch; 2, Part of coppice shoot.

**S. spinosa**. (New species.)<sup>1</sup> *Vern. name*—4, Tsatsi. Rigid shrub 2-3 metres high. Branchlets reduced to spines which bear leaves and racemes. Leaves oval, 1-2 c.m. long, 1 c.m. wide, rounded at both ends. Racemes 2 c.m. long, many flowered. Flowers purple, on pedicels 1 c.m. long, highly ornamental. Samaras as in *S. longipedunculata*. Lourenço Marques, Machava, &c. Sim 6389. Apparently this is the plant from Batoka, Zambesia, referred to in "Flora of Tropical Africa," p. 134.

PLATE V. B. In bud.

## FAMILY VII.—HYPERICINEÆ.

Flowers regular, hermaphrodite. Sepals 5; petals 5; stamens numerous, more or less connate at the base into several groups; ovary 1-3-5 celled. Mostly herbs or shrubs with exstipulate usually opposite leaves in which translucent glands are immersed in some cases. Flowers usually yellow.

22. **HYPERICUM**. Stamens free or nearly so. Ovules numerous; fruit a capsule. Herbs or shrubs.

**H. lanceolatum**, Lam. A shrub or tree 7-10 metres high, with numerous narrowly oval or linear-oval dotted leaves 1-2.5 c.m. long, 4 m.m. wide. Flowers terminal on branchlets, solitary, 3 c.m. across. Stamens slightly connate into 5 bundles. Styles 5; seeds very numerous. Manganya Hills, *Dr. Meller*; also from Nile-land and West Africa.

23. **PSOROSPERMUM**. Stamens in 5 bundles with scales between each. Ovary 5-celled, styles distinct, ovules solitary or occasionally in pairs; fruit a berry. An African genus of shrubs.

**P. febrifugum**, Spach. A shrub or small tree, with opposite or ternate bluntly elliptical, almost sub-sessile leaves 2.5-10 c.m. long, 2-5 c.m. wide; flowers in small terminal cymes or corymbose. Stamens 5-10 in each bundle. Manganya Hills, Zambesia.

24. **HARONGIA**. Stamens in 5 bundles, opposite to the petals, with scales between each. Ovary 5-celled with 2-4 ovules in each. Drupe small, globose, each carpel with a bony endocarp, containing 2-4 seeds. Monotypic.

**H. madagascariensis**, Choisy. A shrub or small tree 10-15 metres in height, more or less tomentose on young parts. Leaves opposite, entire, ovate-oblong, 7-15 c.m. long, 4-8 c.m. wide, connected by a prominent interpetiolar ridge, and glabrescent above and more or less pale and pubescent below. Flowers small in many-flowered corymbose cymes. Berries small. Mozambique, Zambesia, West Africa, Madagascar and Mauritius.

<sup>1</sup>*Securidaca spinosa*. (Nov. sp.) Frutex rigidus, 2-3 met. altus; ramulis spinosis folia racemosque gerentibus; foliis ovalibus, 1-2 c.m. longis, 1 c.m. latis, racemis 2 c.m. longis, multifloris, floribus purpureis, pulcherrimis, pedicellis 1 c.m. longis; samariis *S. longipedunculata* similibus. Lourenço Marques et Machava. Sim 6389. Tab. V. B.



## FAMILY VIII.—GUTTIFERÆ.

Flowers regular, dioecious; in the only local tree in the Family the characters are:—Sepals 4, 2 larger than the other 2; petals 5, greenish, usually reflexed. Male flower—stamens many inserted separately in the raised disc, pistil rudimentary or absent, anthers peltate. Female flower—staminodia many, free, inserted in a circle at the base of the raised disc, ovary sessile, crowned by the sessile stigma, 2-celled, 1 ovule in each cell; fruit a berry. A large Family of tropical trees and shrubs, often yielding yellow or greenish acrid resinous purgative juice.

25. **GARCINIA.** Characters as defined above. The various kinds of gamboge are products of Asiatic species of *Garcinia*, and other species have edible fruits, such as the Mangosteen, &c.

**G. Livingstonei**, T. And. *Vern. names*—1, Wild Plum; 4, Pembe or Pama; 5, Imbe; 10, Inavet; 16, Motsauri or Mokonongo. Either a branched bush, an erect tree or a bushy tree, in each case the stems set with numerous firm, little, more or less evergreen, decussate branches, which give them pyramidal habit, and suit well for native kraal fences. Leaves usually in threes or opposite, entire or irregularly crenate, oval, elliptical or broadly elliptical, rounded at the base, rounded or bluntly pointed at the apex, 5-10 c.m. long, 4-6 c.m. wide, firmly coriaceous, distinctly veined, and with stout petiole 2 m.m. to 1 c.m. long. They vary immensely in size and form with age and condition of tree, soil and exposure. Peduncles 1.5 c.m. long, 1-flowered, produced in clusters on axillary warts on old wood. Fruit 2.5 to 5 c.m. long, oblong, edible, yellow at first, red when ripe, 2-seeded, and used by the natives to make a fermented liquor. Abundant in sandy soil in open bush country near Delagoa Bay; occurs also in the Umbelusi Valley and up to the Lebombo Mountains; at Chai-chai and through the M'Chopes country to Inhambane; and within the tropics on the Zambesi, Quelimane and Magenja da Costa. Not itself a dessert fruit but probably fit for use as a stock for grafting the Mangosteen and other species upon. For its timber see Chapter IV.

PLATE IV. A. 1, Branch with male flowers; 2, Branch showing young leaves; 3, Mature leaf; 4, Male flower,  $\times 3$ ; 5, Fertile flower,  $\times 3$ ; 6, Stamen,  $\times 5$ ; 7, Fruit (small); 8, Section of ovary,  $\times 5$ ; 9, Tree, characteristic habits (much reduced).

## FAMILY IX.—MALVACEÆ.

Flowers regular, hermaphrodite. Calyx 5-fid, valvate in aestivation with or without involucl at the base; petals 5, hypogynous, convolute in aestivation; stamens numerous, monadelphous, the anthers 1-celled, extrorse, and the column connected at the base with the petals. Carpels 5, more or less combined inside the staminal column into an ovary of as many cells. Ovules numerous. Seeds reniform or roundish. Leaves alternate, stipulate, simple. Pubescence usually stellate. A large Family, mostly herbaceous or soft-wooded. The whole Family yields fibre from its inner bark; many species have mucilaginous properties in the leaves and roots; cotton of commerce is the hairs of the seeds of species of *Gossypium*; several are garden favourites on account of their showy flowers, such as the Hollyhock, Malva, Hibiscus, Abutilon, &c., and the Baobab and a few others have more or less edible fruits.

26. **HIBISCUS.** Calyx 5-fid subtended by an involucl; staminal column shortly 5-toothed at apex; ovary 5-celled with or without a spurious dissepiment in each. Style with 5 branches; capsule 5-celled or with each cell partly divided, loculicidally dehiscent. A large genus, mostly herbaceous, in which many species have liber-yielding fibre of commercial value where the cultivation and harvesting can be done cheaply enough.

**H. tiliaceus**, Linn. *Vern. names*—4, 5, 6, 7, 8, 12, Umlolwa, or Nolo; 12, 16, M'lolo. Small tree, evergreen or nearly so, canescent or pubescent in all parts except the upper surface of the leaf. Leaves cordate, 8-12 c.m. long and wide, the base lobes overlapping, the point acute, the under side white, the upper surface glabrous and shining; petioles 3-12 c.m. long, stout, and like the stipules pubescent with stellate hairs. Stipules 1-3 c.m. long, 1 c.m. wide, at first connate on the outer edge, set with stellate hairs. Peduncles axillary, 1 or several-flowered, the flowers 5 c.m. long and wide. Involucl saucer-shaped, of about 8 short triangular teeth; calyx of 5 large lobes and short cup. Petals 5 c.m. long, oblique, wavy at the margin, at first yellow, afterwards brown, and with a dark spot at the base. Column 3 c.m. long, bearing anthers on short filaments along its whole length, and surmounted by the 5-fid stigma. Capsule oblong, 2.5 c.m. long, hispid with stout yellow hairs and opening by the netted dissepiments into 5 double valves. Frequent close to the coast throughout the Province and occurs on most tropical and sub-tropical coasts. Used satisfactorily as a shade-tree in the streets of Durban, planted as pole-cuttings, and recently planted in some of the streets of Lourenço Marques and Inhambane. See "Forest Flora of Cape Colony," 143 and Plate XIV. Fibre from its bark is used in India for rough ropes, and in Formosa for caulking purposes, and is one of several fibres used by the natives of Zambesia under the name M-lolo. The timber is seldom used.

PLATE IX. 1, Fruiting branch; 2, Young branch, showing stipules; 3, Flower; 4, Section of ovary; 5, Seed; 6, Tree, general aspect (reduced); 7, Stellate hairs on stipule,  $\times 20$ .

27. **THESPESIA.** Calyx cup-shaped, truncate, with 5 very small teeth; involucre of 5 caducous segments; petals and staminal column as in *Hibiscus*; pistil with a club-shaped, twisted, 5-toothed stigma; ovary 5-celled, each cell several seeded in 2 rows, the seeds reflexed from the end of the dissepiment. Fruit not properly dehiscent.

**T. populnea**, Cav. A small evergreen tree, shining green throughout, with hard woody slender twigs; glabrous, except for minute peltate scales dark at the centre and white outside which cover all exposed parts when young, and remain on the under side of the leaf and on the inflorescence. Leaves alternate, broadly cordate from a wide base, pointed, shining above, green below, 8-12 c.m. long and wide, on 5-10 c.m. slender petioles. Stipules 1-7 m.m. long, somewhat terete, covered with peltate scales, caducous; peduncle solitary, axillary, 1-flowered as long as the petiole, slender, terminated by 2-5 raised projections the scars of the caducous involucre bracts. Calyx 1 c.m. wide and deep; petals 7 c.m. long, connected at the base only, oblique, imbricating, with wavy margin, yellowish with a dark spot at the base of each, and with peltate scales on the outer surface. Column 2.5 c.m. long. Fruit shortly conical from a wide base, thickly leathery, glabrous, 4 c.m. diameter, 2.5 c.m. deep, the outer portion containing in abundance a yellow fluid, and drying off eventually in 5 valves, leaving the seeds encased in the fibrous cell-walls. Seeds 7 m.m. long, irregularly shaped in accordance with pressure. Not unlike *Hibiscus tiliaceus* and found with it in the tidal mud at Luabo and Quelimane, and on dry rocky banks near the sea at Bartholomai Dias. Useful for coast protection.

PLATE X. 1, Flowering branch; 2, Stipules; 3, Petal; 4, Column; 5, Peltate scale,  $\times 5$ ; 6, Anther,  $\times 10$ ; 7, Fruit; 8, same, open; 9, Section of same; 10, Seed; 11, Tree, general aspect (reduced).

**T. Lampas**, Benth. An Indian tree, having palmately 3-lobed leaves 7-10 c.m. wide, downy on the under surface, is recorded from Zambesia and Rovuma by Drs. Kirk and Meller, but was not seen by me.

28. **ADANSONIA.** Calyx cup-shaped, leathery, with 5 large segments; involucre none; petals 5, very large; staminal column divided above into many filaments and surmounted by the several-lobed stigma. Ovary 5-10 celled, cells many-ovuled. Fruit an indehiscent, woody pod, containing many seeds and filled with pulp. Seeds reniform. Leaves digitate.

**A. digitata**, Linn. Vern. names—1, Baobab; 6-7, Chiwooya. A deciduous tree 15-25 metres high with an enormous bole, up to 10 metres diameter, cylindrical or conical below and suddenly reduced into comparatively small horizontal branches, on which the twigs are 1-2 c.m. diameter up to the abrupt point and hairy at the apex. Petiole 12-16 c.m. long; leaf digitate, about 8-foliate; leaflets 10-15 c.m. long, widely lanceolate or oblong-acuminate, entire, wavy, somewhat pubescent below, tapering to a petiolule at the base. Peduncles axillary, 1-flowered; calyx-lobes 5 c.m. long, leathery, hairy inside; petals 2-3 times as long in large flowers, rounded, plaited; column 4 c.m. long, bearing in the upper part many filaments bearing 1-celled anthers. Flowers produced before the leaves. Fruits oblong, 8-16 c.m. long, 7-9 c.m. diameter, containing acidulous refreshing pulp among the seeds. Scattered over most of Tropical Africa and Asia, but not present everywhere. It is not uncommon in the neighbourhood of Inhambane, extending south to Inharrime (extra-tropical), but though Peters gives "along the whole coast" as its habitat in Mozambique district, I did not see a tree of it in Quelimane, Magenja da Costa or Nhamacurra. It occurs, however, further up the Zambesia in the Tete district.

PLATE XI. 1, Branch and leaf; 2, Small flower; 3, Small petal; 4, Column; 5, Small fruit; 6, Seed; 7, Tree, general aspect (reduced).

29. **BOMBAX.** Calyx tubular, truncate; corolla of 5 petals connected with the base of the column; staminal tube slender, 2 c.m. long, then divided into 5 lobes, each of which divides in pinnate manner into about 20 stamens with long slender scarlet filaments, and 2-celled or occasionally 3-celled anthers; ovary 5-celled with many ovules in each cell, soon 1-celled with 5 rows of ovules (about 5 in each row) set on a central axis; capsule coriaceous, dehiscent, containing numerous seeds embedded in wool.

**B. Buonopozense**, Beauv. Vern. names—2, Simonia; 10, M-kungo. A large or very large, nearly deciduous, glabrous tree, with more or less whorled and horizontal branches, ascending branchlets, and decorticating glaucous bark. Leaves petiolate, alternate, digitate, with about 6 leaflets, each 3-10 c.m. long, 1.5-3 c.m. wide, obovate, pointed, and shortly petiolulate. Flowers numerous in axillary clusters of 2 to 10, either on separate 1-3 c.m. pedicels jointed near the base or 2-3 together on a very short common peduncle. Calyx-tube 1.5 c.m. long, 1 c.m. wide, with 5 very short teeth and minutely pubescent; petals 5, scarlet, 5-7 c.m. long, 1 c.m. wide, usually the upper 3 together and the other 2 separate; stamens as long as the petals; pistil longer or shorter than the stamens; style slender, hairy below the stigma, somewhat arched, scarlet. Capsule 10-15 c.m. long, many seeded, the seeds set in red wool. A tree evidently introduced long ago to Quelimane, now more or less naturalised for a long distance round but also planted as a street tree. One specimen at Arenga is 4 metres diameter, 10 metres bole, and 20 metres



height. It occurs also in West Africa. This and *Eriodendron* are hardly differentiated by the public; they have similar habit, bark, leaves and pods, and are given the same names and used for the same purposes, principally for use as dug-out boats. A tree of rapid growth and soft timber; the colour of its wool is against that being favoured as a commercial commodity.

PLATE XII. 1, Tree, general appearance (reduced); 2, Flowering branch; 3, Leaf; 4, Staminal column; 5, Same, spread out; 6, Section of ovary,  $\times 3$ ; 7, Anthers, normal and abnormal; 8, Section of calyx and ovary,  $\times 4$ ; 9, Stigma and upper part of style,  $\times 5$ .

30. **ERIODENDRON.** Calyx cup-shaped, shortly 5-lobed; petals connate at the base and with the staminal column, which is for the greater part divided into 5 bundles each of 3 sessile twisted anthers; ovary 5-celled, or soon 1-celled with the ovules numerous in 3 lines on each of 5 axile placentæ separated by the remains of the papery dissepiments. Fruit a coriaceous dehiscent capsule 10-15 c.m. long, the seeds bedded in cottony wool. Leaves digitate.

**E. anfractuosum, D. C.** *Vern. names*<sup>1</sup>—1, Kapok; 2, Simoma or Somha-uniba; 10, M-Kungo. A large erect tree 20-30 metres high, with stout straight trunk, horizontal more or less whorled branches, ascending branchlets, and decorticating glaucous green bark, occasionally with a few stout prickles toward the base which disappear from old trees. Not regularly deciduous but mostly so; perhaps deciduous in all cases sometime during the year. Leaves irregularly alternate, 1.5-3 c.m. apart on stem, digitate, 5-7 foliate, glabrous, green above, pale under; the petioles 1.5-2.0 c.m. long, adhering to the branch after the leaflets disarticulate. Leaflets shortly petioled, widely lanceolate, pointed, 7-15 c.m. long, 2-4 c.m. wide, variable in form on different trees but alike on one. Flowers profusely produced on the previous year's wood, short warts in the axils producing 2-10 flowers each on terete 1-flowered peduncles 2.5-5 c.m. long. Calyx green 1.5 c.m. long, 1 c.m. wide, canescent outside. Style swollen at the base on 1 side and connected by a constriction to the ovary, decumbent as also are the staminal bundles more or less, these looking like 5 stamens. Seeds numerous, bedded in white cottony wool which is an article of commerce elsewhere for packing fruit, filling pillows, &c. Imported long ago to Quelimane, now spontaneous in many parts of that district. It occurs also in West Africa and in East and West Indies, and is planted throughout the tropics. The greenish smooth bark of this and *Bombax* as well as of several species of *Sterculia* and *Cola* is a marked character.

PLATE XIII. 1, Tree, general aspect (reduced); 2, Flowering branch; 3, Leaf; 4, Pod; 5, Staminal bundles; 6, Anthers,  $\times 2$ ; 7, Pistil; 8, Base of style,  $\times 2$ ; 9, Stigma,  $\times 4$ ; 10, Transverse section of ovary; 11, Section of ovary; 12, Seed.

Among other local economic plants belonging to *Malvaceæ* may be mentioned:—

**Sida**, several species; small semi-herbaceous plants containing strong fibres which are fit for ropemaking and textile purposes. They are scattered through the Province but not utilised, and even in other countries their cultivation is seldom seriously taken in hand.

**Abutilon**, several species of perennial undershrubs, sometimes 8-10 feet high and always having useful fibre in the bark. One species is used for cordage in the M'Chopes under the name *Nylebasian*, and the same or a similar species is similarly used in Lourenço Marques district under the name *Nuce*, but neither has been cultivated.

**Urena lobata**, Linn. A virgate undershrub, widely distributed over the warmer parts of the world, is frequent in the cultivated lands from the Limpopo northward, apparently as an introduced weed. It has, however, a valuable fibre, which is used undressed for cordage, and the plant is known in M'Chopes as *Sosowa*. Probably its cultivation for fibre may be worth taking up.

**Hibiscus**, several species produce useful fibres, particularly *H. cannabinus* (2, Ambar), which is frequent in cultivated lands throughout the Province, and has probably been introduced from India where its fibre is a considerable article of commerce. *H. Subdariffa* is also frequent as a cultivated or escaped plant and used for various culinary purposes, this being the *Roselle* of India, and the source of the beautiful *Sorrel Jelly* of Natal.

**Gossypium**, the Cotton plant, occurs frequently, in a more or less naturalised condition, but is probably not originally indigenous, or at least the only species which may be claimed to be so is a form of *G. herbaceum* having short brown cotton which is not uncommon in the forest glades of Magenja da Costa, where it is known as *Igantoge*, while the long-stapled white cotton found near the kraals is known as *Mtodye* there, and as *Bushale* at Lourenço Marques. Cotton is cultivated to a small extent by the Companies near Beira and Quelimane, but it can hardly be called a local industry so far, while among the natives its cultivation is as a curiosity rather than for its fibre.

<sup>1</sup>Applied also to *Bombax*.

The "Wild Cotton" common throughout the Province as a creeper does not belong to this Family, but is *Ipomaea albivenia*, which has not yet been turned to account for textile purposes.

#### FAMILY X.—STERCULIACEÆ.

Flowers regular, hermaphrodite or unisexual. Calyx gamosepalous, 5-lobed or 5-fid; petals absent, or 5, free, contorted in aestivation, more or less attached to the base of the staminal column. Stamens with filaments united into a column or connate at the base, either with or without staminodia. Ovary free, 2-5 celled or of 2-5 more or less free carpels; cells several-ovuled. Fruit various. Leaves usually alternate and stipulate; pubescence often stellate; inflorescence usually axillary, either solitary, racemose or paniculate. A large Family, widely distributed. The larger trees have usually soft, white timber; cocoa, chocolate, cola and gum tragacanth are products; several yield valuable fibre barks, and in horticulture *Brachychiton*, *Sterculia*, *Dombeya*, *Hermannia*, and others are floral favourites.

31. **STERCULIA.** Flowers unisexual; calyx cup-shaped, 5-fid or 5-lobed; petals absent; staminal column bearing many extrorse anthers, crowded without arrangement; ovary of 5 partly coherent carpels, with several ovules in each; ripe carpels separate, coriaceous, dehiscent, 1 or several seeded; seeds albuminous, albumen adherent to the cotyledons, so liable to be overlooked. Leaves alternate, simple or lobed or digitate; inflorescence in axillary or terminal panicles. A large tropical and sub-tropical genus of trees and shrubs, usually with glaucous bark.

**S. Triphaca**, R. Br. A large tree with roundish or 3-lobed cordate petiolate leaves, 10-13 c.m. long, *nearly glabrous on both surfaces*, and with the lobes acuminate and entire, the central lobe largest. Inflorescence a much-branched axillary panicle, 5-6 c.m. long with the flowers on short jointed pedicels. Calyx 1 c.m. long, 5-lobed, canescent outside, pink and glabrous within. Column shorter than the calyx; follicles 3-5 spreading, ovate-acuminate, downy. Seeds arillate on a villose placenta. Zambesi (Dr. Kirk), Senna (Peters).

**S. tomentosa**, Guill. *Vern. name*—10, M'lola, which name is applied to several fibre-producing trees. A medium-sized tree with smooth glaucous bark. *Leaf 7-10 c.m. wide*, nearly as long, cordate at the base, palmately 5-7 veined, and *with 3 rounded lobes* and 5 c.m. petiole; *both surfaces tomentose* with stellate hairs, or the upper surface ultimately glabrescent or rough; the lower surface closely reticulated. Flowers and fruit not seen by me, but described as being in much-branched axillary panicles; calyx 1-5 c.m. long, cup-shaped, 5-fid, downy; carpels 3-5, sessile, densely tomentose, with numerous purplish seeds and yellow horny arils. This species occurs in other parts of Tropical Africa but is not previously recorded from here, and I am not sure that my specimens, which are from large trees in the forests of Magenja da Costa, belong to it, which has the lobes described as acuminate; if not they appear to be an undescribed species, but as they are leaf-specimens only, the material is too imperfect for further description. Sim 5978.

PLATE VII. B. 1, Leaf; 2, Stellate pubescence.

**S. quinqueloba.** (New species.)<sup>1</sup> *Vern. name*—10, Gampheba. A large tree with smooth glaucous or nearly white decorticating bark, which is red when cut. *Leaves 17-30 c.m. wide and long, 5-lobed from a cordate base, 5-veined from the base, softly pubescent or at length glabrescent above, the under side densely set with permanent soft whitish stellate pubescence mixed on the veins with longer hairs; lobes acute; petiole 15-45 c.m. long, hairy.* Leaves more or less crowded toward the end of the branch, with inflorescence in axillary panicles in the upper axils. Panicles 10-20 c.m. long, often much branched, main rachis hairy, pedicels buds and flowers pubescent; calyx bell-shaped 5 m.m. long, 5-lobed; anthers about 15 crowded on top of the column; carpels about 5, 8 c.m. long, spreading, oblanceolate, acute, opening at maturity, densely grey-velvety outside, and with white pubescence inside. Seeds 1 c.m. long, purplish-black. I think this is not *Cola quinqueloba*, Garcke; at least this is a *Sterculia* with crowded stamens and albuminous seeds. Differs from *S. tomentosa* and *S. cinerea* as described in size and outline of leaf, size of flower, &c. Frequent in alluvial soil in Magenja da Costa and Nhamacurra (*Tropical*). Timber white, hard, not used. Sim 998.

PLATE VI. 1, Small leaf and inflorescence; 2, Flower,  $\times 5$ ; 3, Same, perianth opened out,  $\times 5$ ; 4, Carpels; 5, Tree (reduced).

<sup>1</sup>*Sterculia quinqueloba.* (Sp. nov.) Arbor magna, cortice levi glauco aut albido; foliis 17-30 c.m. longis et latis, cordato 5-lobis, 5-nerviis, pagina superiore pubescentia molli tecta vel denique glabrescente, pagina inferiore pubescentia albida molli stellata dense vestita supra venas pilis longioribus intermixtis, lobis acutis; petiolo 15-45 c.m. longo, hirsuto; inflorescentiis paniculatis in axillis foliorum superiorum, 10-20 c.m. longis, saepe ramosissimis, rachi hirsuto; pedicellis, gemmis et floribus pubescentibus; calyce campanulato, 5 c.m. longo, 5-lobato, columna staminea apice antheras circa 15 congestas gerente; carpellis circa 5, 8 c.m. longis, patulis, oblanceolatis, acutis, maturis dehiscentibus, extus pubescentia cana velutina densa, intus pubescentia alba vestitis; seminibus 1 c.m. longis atro-purpureis, albuminosis. Frequens in Magenja da Costa, et Nhamacurra. Sim 998. Tab. VI.

A species of *Sterculia* (Sim 6277 and 6328) known as (4, 15) Mforkonwan, is frequent in the Lebombo range as a shrub 2-4 metres high with a stem 30-60 c.m. diameter at the ground, but immediately divides into many spreading glaucous branches. No mature leaves were seen; the very young leaves were nearly glabrous, and more or less cordate, the flowers produced in sessile clusters of 3 to 5, each flower on a pedicel 5-10 m.m. long; calyx cup-shaped, 5-lobed, 1.5 c.m. wide, with white stellate pubescence outside as well as toward the points of the purplish striated lobes inside; column 1 c.m. long with about 15 crowded anthers; carpels 2-4, densely tomentose, rostrate when young, ultimately firm, 3 c.m. long, 4-5 seeded, and with stellate pubescence outside and inside. Young wood warty, old bark smooth and glaucous. This is apparently an undescribed species, but in the absence of leaves must remain unnamed for the present. Other 2 unnamed species are mentioned in the "Flora of Tropical Africa" from the Rovuma, concerning which I can add nothing.

An introduced *Sterculia* forming a large straight tree with digitate leaves occurs in and around Quelimane, hardly naturalised as yet, though likely to be so soon, which in general appearance and habit resembles *Bombax* and *Eriodendron*. It is known by the Portuguese name *Pinho*.

32. **COLA.** Flowers unisexual or polygamous, in axillary clusters. Calyx 5-lobed; petals absent; column bearing a single row of anthers, with or without ovary above them; ovary 5-10 celled, ovules numerous; carpels 4-5, free, leathery, dehiscent, with 3-6 exalbuminous seeds. Leaves simple. An African genus, of which 1 species *C. acuminata* is an important factor in the commerce of Tropical West Africa, as its seeds are the Kola-nuts, used as a nutritive stimulant and in the preparation of an aerated water, &c. 1 species occurs in Natal.

*C. cordifolia.* (New species) = *Sterculia cordifolia*, Guill. & Perr., Fl. Seneg. I. 79, t. 15. Vern. name—10, Impeba. A large tree. Leaves alternate, cordate, acute, or sometimes 2-3 pointed, 5-7 nerved from the base, finely stellate pubescent on both surfaces, 7-10 c.m. long and wide, with a pubescent petiole 5-8 c.m. long. Flowers in small few-flowered panicles from the old wood; calyx 1.5-2 c.m. across, brown inside, pubescent outside and inside, cut more than halfway into 5 lobes, the column 1 c.m. long, the anthers parallel in 1 circle close under the hairy usually abortive ovary, which is 3-lobed and terminates in a subulate point. Carpels 1 or several, 5-7 c.m. long, obliquely pear-shaped, coriaceous, dehiscent. Seed not seen. Bark used for cordage. Forests of Magenja da Costa at Arenga, Maquebella, Bajan, &c. (Sim 5655). Known also from Senegambia.

PLATE VII. A. 1, Flowering branch; 2, Carpel; 3, Staminal column with abortive ovary,  $\times 3$ .

*C. clavata*, Mast. Collected by Drs. Meller and Kirk at Shamo, is unknown to me but is described as a tree of considerable size with simple, sub-coriaceous, glabrous, 1-nerved, oblong-obtuse or elliptical leaves, 5-7 c.m. long, 4-5 c.m. wide, and axillary solitary or clustered 1-2 c.m. pedicels bearing club-shaped 1-seeded indehiscent fruits 3-4 c.m. long, with yellow oblong seeds.

*C. quinqueloba*, Garcke. May or may not be what is here described as *Sterculia quinqueloba*. It is said to be a tree 70 feet in height with leaves roundish, sub-coriaceous, glabrous, 20-24 c.m. long, cordate, palmately 3-7 lobed, on petioles 20-25 c.m. long; lobes rounded or acuminate. Inflorescence terminal, much branched, paniculate. Flowers small, villose. Calyx 5-fid. Carpels 3-5, rusty-tomentose, downy inside. Ovules numerous. It is recorded from Macunga (Peters) and Zambesi (Dr. Kirk).

33. **HERITIERA.** Flowers unisexual; calyx bell-shaped 4-5 fid; petals absent; in the male flowers the slender column bears 4-5 anthers in a circle; anther cells parallel. Ovary 5-celled, stigmas 5; fruit-carpels woody, boat-shaped, indehiscent; seeds exalbuminous. A Mangrove, with valuable timber, simple coriaceous, stipulate leaves, and axillary panicles of small white flowers.

*H. littoralis*, Dryand. Vern. names—2, Luabo; 10, Muolobo or Mologo; 11, Ide. A much-branched tree 6-10 metres high, with stem 40-60 c.m. diameter, frequent in tidal mud or just above tide mark, from Inhambane northward, and recorded as far inland as Tete by Sir John Kirk. Leaves alternate, 7-15 c.m. long, 4-5 c.m. wide, oblong-lanceolate from a cordate base, covered with yellow peltate scales on the under surface, and also at first on the upper surface. Stipules 6 m.m. long, set with peltate scales, caducous. Panicle rising from the old wood, 8-10 c.m. long, set with stellate hairs; flowers numerous, 4 m.m. wide; perianth bell-shaped, 4-5 fid, hairy outside and inside. Fruits single or 2-4 together, woody, boat-shaped, 5 c.m. long, 3-4 c.m. wide, with a decided keel, 1-seeded, the radicle ultimately starting through a split. Sim 5544.

PLATE XIV. 1, Leaf-branch; 2, Panicle; 3, Flower,  $\times 6$ ; 4, Perianth opened,  $\times 6$ ; 5, Column,  $\times 20$ ; 6, Top view of same,  $\times 20$ ; 7, Fruit; 8, Do., germinating; 9, Stipule, showing peltate scales,  $\times 10$ ; 11, Part of leaf, showing peltate scales; 12, Stellate hair of inflorescence; 13, Tree, general aspect (reduced).



34. **DOMBEYA**. Flowers hermaphrodite, usually subtended on 1 side by a 2-3 leaved deciduous involucre. Inflorescence cymose. Calyx 5-parted; petals 5, convolute in bud, persistent; stamens 10-15, connate at the base, alternating in 2's or 3's with 5 longer staminodia; filaments free above and the anthers extrorse. Ovary 3-5 celled; style single with as many tips; ovules several in each cell, usually 4 in 2 superimposed pairs. Capsule leathery, 3-5 celled, dehiscent; cells 1-2 seeded. Seeds albuminous. Leaves alternate, stipulate, usually cordate-lobed.

**D. multiflora**, Planch. *Vern. name*—15, Beobandle. A rigid and more or less deciduous shrub, frequent on rocky ridges of the Lebombo range. Leaves 3-5 c.m. long and wide, widely cordate, irregularly toothed, acute, very firm, 3-5 veined, reticulate, roughly stellate, pubescent on both sides, and with pubescent petiole 1-2 c.m. long. Inflorescence shortly racemose from leafless old wood; racemes 1-3 c.m. long, numerous; flowers small, 1-5 c.m. across, white; calyx reflexed. Sim 6318.

PLATE VIII. C.

**D. spectabilis**, Bojer. *Vern. name*—10, Mlolo, which name is also applied to several other fibre-bearing trees. Evergreen tree 6-10 metres high, 30 c.m. diameter of stem. Leaves 10 c.m. long and wide, or larger, cordate, hard, finely toothed, rather rough, with fine stellate pubescence above, and more dense below, 5-7 veined at the base, and with numerous cross-veins in relief. Petiole 5 c.m. long, minutely pubescent. Inflorescence axillary, abundant, cymose pubescent; cymes many flowered, 7-15 c.m. long, flowers 2 c.m. wide, sepals lanceolate. Frequent between Arenga and Maquebella, Magenja da Costa, where the fibre of the bark is used for rough cordage. Sim 5966.

PLATE VIII. A.

**D. Kirkii**, Mast. A shrub or small tree unknown to me but described as having the younger parts covered with dense stelliform tomentum. Leaves petiolate, cordate-ovate, acuminate often more or less 3-lobed, the lobes acute or acuminate, coarsely and irregularly crenate-serrate. Peduncles axillary and terminal, longer than the leaf stalks; pedicels slender 2.5-5 c.m. long with spreading villi. Flowers small, sepals oblong lanceolate; petals obliquely cuneate, retuse, double the length of the calyx. Filaments free nearly to the base; ovary downy; stigmas 2-5, included. Lat. 16° S., *Dr. Meller*; Lupata, Sir John Kirk.

**D. Burgessiae**, Gerr. *Vern. name*—10, Nyakowe. A hairy shrub 3-4 metres high, with numerous more or less virgate branches. Inflorescence axillary, very profuse towards the point of the branch, forming collectively a large leafy panicle, the leaves of which are cordate, 5-10 c.m. long and wide, while the lower leaves are 10-20 c.m. long and wide and 3-5 lobed, all palmately 3-5-7 veined, and softly tomentose on both surfaces. Umbels bracted, 5-10 flowered, on peduncles 5-15 c.m. long; pedicels 2.5-5 c.m. long, pubescent; flowers 3 c.m. across, pinkish white; sepals pubescent, lanceolate; fruit very hairy, tipped by the 5-rayed pistil. Occurs in Natal, and occasionally throughout the Province; it is used by the natives for the production of fire by friction; its fibre is occasionally used, and it is well worth cultivation for its flowers. Sim 5726.

PLATE VIII. B.

Another species of *Dombeya*, perhaps *D. Natalensis*, Sond. occurs at Delagoa Bay and is known as *Sicara*, but only incomplete material was obtainable.

FAMILY XI.—TILIACEÆ.

Flowers hermaphrodite; sepals 4-5; petals 4-5; stamens many, filaments free, hypogynous or rising from a torus; anthers 2-celled, introrse. Ovary 2-4 celled, 2-many-ovuled; style single; stigmas as many as the ovary cells. Seeds albuminous. Leaves simple alternate, stipulate. The bark usually contains a tough fibre, Russian Mats and Jute being commercial products of the Family.

35. **GREWIA**. Stamens and pistil on a columnar torus 2-5 m.m. long, from the base of which the sepals and petals arise. Sepals 5, deciduous, petaloid on the inner surface. Petals 5, each with a gland at its inner base. Stamens numerous, free, ovary 2-4 celled with a simple style; drupe 1-4 lobed, each lobe containing one 1-2 seeded stone. Cymes axillary, 1-4 flowered. A genus of straggling or subscandent shrubs of no practical utility of which 17 species are recorded from Mozambique Province and 10 from South Africa, 3 only being common to both. See "Forest Flora of Cape Colony," Plates XV. and XVIII., for *G. lasiocarpa*; *G. occidentalis* and *G. flava*, and "Natal Plants," Plate 42, for *G. caffra*, all of which belong to our district. The natives use the branches in the construction of fish-kraals, and occasionally eat the fruits, though there is little quality in them. The species are not well distinguished either by natives or botanists, but the following *vern. names* are in use in the group:—4-5-6, Suiss and Mbodwa; 7-8, Tchapande; 10, Inpara; 11, Maitoinatorulo. The name (4) Shamunyamanyan is also used for this and other similar shrubs.



36. **GLYPHÆA**. Sepals 5, distinct; petals 5, without glands; anthers linear, adnate, opening by terminal pores; ovary 8-10 celled; ovules numerous in each cell; fruit oblong, fusiform, sulcate, *indehiscent*, with fibrous mesocarp and endocarp pitted to receive the numerous albuminous seeds. Leaves oblong, finely toothed; cymes terminal or lateral; flowers conspicuous, yellow. Unknown to me.

**G. tomentosa**, Mast. Is a shrub having slightly oblique, oblong, acuminate, irregularly dentate, 3-costate leaves, villose above, stellate-tomentose below, 5-10 c.m. long, 2.5-5 c.m. wide; large showy flowers in terminal many-flowered cymes, and fusiform deeply sulcate fruit 5-7 c.m. long, 2 c.m. diameter, from Zambesia.

37. **CARPODIPTERA**. Unknown to me but described as having "Calyx bell-shaped, 5-fid. Petals 5, glandless at the base. Stamens indefinite, free or slightly coherent at the base; torus not prolonged. Staminodia 0; anthers roundish; ovary 2-celled (4-celled?); ovules solitary and pendulous from the upper and inner angle of each cell of the ovary; stigmas distinct, sessile, large, sub-petaloid. Capsule sub-globose, 2-valved, each valve extended into 2 long, unequal, obtuse, foliaceous wings. Seeds solitary in each cell, pendulous. Albumen fleshy. Trees with entire or cordate leaves. Flowers small, in axillary cymes." This genus was founded on a Cuban plant, the following species from the Rovuma was added in the "Flora of Tropical Africa," and now with considerable hesitation and in the absence of flowers I have added a third species.

**C. africana**, Mast. A tree from the Rovuma River having oblong, acute, sometimes obscurely lobed, 1-nerved, long-petioled, pilose leaves 10-15 c.m. long, and extra-axillary peduncles 5-7 c.m. long, dividing into 5-6 cymose pedicels each about 2.5 c.m. long. "Capsule sub-globose, 2-valved, 1-celled, each valve provided with 2 unequal, obtuse, foliaceous wings 1 or 2 inches in length,  $\frac{1}{2}$ - $\frac{3}{4}$  inch in breadth. Seed solitary, pendulous, villose."

**C. minor**. (New species.)<sup>1</sup> *Vern. name*—4, Incalago. A glabrous shrub or small tree 3-4 metres high, frequent on the Polana, Lourenzo Marques, having alternate, obovate, shortly petioled leaves 3-5 c.m. long, 2 c.m. wide, and supra-axillary 1-flowered solitary peduncles 1-1.5 c.m. long. Flowers not seen; fruit 2-celled, consisting of 2 compressed samara-like carpels, attached to a central placenta, from near the top of which the seeds are pendulous. Carpels 2 c.m. long, each 1-seeded, and with an oblique membranous dorsal wing 2.5 c.m. long, 2 c.m. wide. Seed compressed, pendulous obovate, albuminous. The raw juice of the leaves and stem is used by the natives instead of soap. Sim 5555.

PLATE III. C.

FAMILY XII.—LINEÆ.

Flowers hermaphrodite, regular. Sepals 5; petals 5; stamens about 10, the filaments united at the base into a cup; ovary free, 3-celled, cells 1-ovuled. Leaves entire, alternate. Mostly herbs in temperate regions, but with a few trees and shrubs within the tropics; widely dispersed.

38. **ERYTHROXYLON**. Flowers axillary, solitary or fascicled. Petals imbricating, deciduous, white, each furnished near the base on the inner surface with a 2-lobed scale, each lobe scarious and emarginate. Filaments connate  $\frac{1}{3}$  of their length. Ovary free, 3-celled with solitary ovules. Styles more or less connate. Drupe of 3 cells, but only 1 of them fertile, 1-seeded. Seed albuminous. Glabrous tropical trees. The name, meaning redwood, is derived from the colour of the wood in some exotic species; the colour of the wood in local species is not known, but possibly this furnishes 1 of the beautiful red unidentified timbers.

**E. monogynum**, Roxb. A small tree, with stem up to 45 c.m. diameter, often a much-branched shrub. Twigs compressed and somewhat distichous, older branches terete. Leaves obovate, coriaceous, entire, glabrous, pale or glaucous on the under surface, 2.5-7 c.m. long, 1-3 c.m. wide, rounded at the apex and rounded or tapering to the 5-7 m.m. petiole. Stipule axillary, scale-like, caducous, keeled. Peduncles axillary 1-2 c.m. long. Fruit 1 c.m. long, nblong, red or purplish, of 3 equal cells but only 1 fertile and 1 seeded. Present but not common throughout the Province, as also in Natal, Eastern Cape Colony, Transvaal, West Africa, India, &c. A variety with smaller and more cuneate leaves, pale under, and longer peduncles, found in Gaza and Transvaal, may be specifically distinct. Included here are *E. caffrum*, Sond.; *E. pictum*, E. Mey.; *E. emarginatum*, Sch. & Th. ("Flora of Tropical Africa," I. 274), and *Sethia indica*, D.C. See "Forest Flora of Cape Colony," 150, Plate XVII. fig. 1. In Magenja da Costa this was named *na-ire*, but I doubt the correctness of that name, which is used as synonymous with Pau-ferro.

<sup>1</sup> *Carpodiptera minor*. (Nov. sp.) Frutex glaber, aut arbor parva 3-4 met. alta; foliis alternis, obovatis, 3-5 c.m. longis, 2 c.m. latis, petiolis brevibus; pedunculis supra-axillaribus, solitariis, 1-1.5 c.m. longis, unifloris; floribus haud visis; fructu biloculari; samaris 2, monospermis, 2 c.m. longis, ala obliqua membranacea dorsali 2.5 c.m. longa, 2 c.m. lata, praeditis; placenta axillari; semine pendulo, obovato, compresso, albuminoso. Frequens in Lourenzo Marques. Sim 5555. Tab. III. C.

## FAMILY XIII.—MALPIGHIACEÆ.

Flowers hermaphrodite, somewhat irregular; calyx 5-fid; petals 5, unequal; stamens 10, all perfect; anthers introrse; ovary 3-celled; cells 1-ovuled. Fruit carpels samaroid, each cell 1-seeded. Leaves simple; inflorescence various. A large tropical Family of trees, shrubs and climbers.

39. **ACRIDOCARPUS**. Flowers in terminal or sub-terminal racemes, yellow. Stamens 10, filaments free. Ovary 3-celled, each cell dorsally winged; styles 2, long, spreading. Fruit of 1-3 connate 1-seeded samaras, each with a dorsal wing only. Leaves alternate, exstipulate. Shrubs or climbers.

**A. natalitius**, Juss. *Vern. names*—5, Nyameluru; 6, Mabote. A scandent or sub-scandent shrub, having glabrous obovate entire leaves 6-10 c.m. long, 1-3 c.m. wide, and terminal rusty-pubescent racemes 4-15 c.m. long; each flower on a pedicel 3 c.m. long. Petals yellow, clawed, somewhat fimbriated at the margin, unequal, the lower with longer claws than the others. Open flowers 2.5 c.m. across. Samaras 4 c.m. long and 1 c.m. wide. Frequent in Gaza and M'Chopes; in Gaza the roots are used in medicine to make the natives brave to fight, in M'Chopes that is not done but it is used to purify after friends have died. See "Forest Flora of Cape Colony," 150, Plate XVII. fig. 2.

**A. chloropterus**, Oliv. From the shire, Zambesia, is unknown to me but is said to have larger oval-oblong leaves with matted deciduous tomentum, at length glabrate at least above, racemose flowers, triangular lanceolate bracts, and pale green samara-wings 2.5-3 c.m. long.

40. **TRIASPIS**. Flowers umbellate in terminal panicles; calyx without glands; petals fimbriate below; stamens 10; filaments free or nearly so; ovary 3-celled, styles 3, elongate. Fruit carpels winged leaves opposite or sub-opposite, with or without stipules.

**T. mozambica**, A. Juss. A shrub with opposite elliptical glabrous leaves 5 c.m. long, 3 c.m. wide and terminal panicles of umbellate flowers. "Dorsal wing of the nuts deeply 2-fid above,  $\frac{3}{4}$ -1 inch long and broad, with radiating anastomosing nervures," Mozambique. *Forbes*.

## FAMILY XIV.—ILICINEÆ.

Flowers regular, perfect, 5-6 merous, without disc, axillary in fascicles or clustered cymes. Calyx 5-6 fid, small, persistent; corolla monopetalous, rotate, 5-parted, the segments connate at the base only, imbricate in aestivation. Stamens 5, alternate with the petals, not connate, but attached to the base of the corolla. Filaments subulate, anthers short, cordate, introrse, 2-celled, opening by longitudinal slits. Ovary sessile, free, 4-6 celled, cells 1-2 ovuled, ovules pendulous, stigmas sessile. Drupe somewhat fleshy, pyrenes 4-6, bony, 3-seeded. Seeds albuminous. Leaves alternate, simple.

41. **ILEX**. Characters of the Family as described above. A widely-distributed genus of trees and shrubs, several of which are used in cabinet work, the leaves of some species are used as tea, and the bark of others as a febrifuge. The European Holly is *Ilex aquifolium*.

**I. capensis**, Harv. & Sond. *Vern. names*—1, Water-tree; 4, Secamafusa; 13, Uniduma; 14, Waterboom. A tree 6-20 metres high, 30-60 c.m. diameter of stem, usually found near running water and having alternate, widely lanceolate, nearly or quite entire, coriaceous, undulated, shining, shortly petioled leaves 8-10 c.m. long, 2-3 c.m. wide, numerous axillary clustered small flowers on pedicels 1-2 c.m. long, and globose red drupes 5 m.m. diameter. Nuts 4-6, very hard. Scattered through the Marraquene and Maputa districts, also in Natal and Cape Colony. Timber useful soft white wood, but seldom available here of size. See "Forest Flora of Cape Colony," 151, Plate XX.

## THALAMIFLORÆ. GROUP II.

Flowers having a more or less evident disc, outside which the sepals and petals are free or nearly so. Stamens inserted under, on or inside the disc. Ovary free upon or partly immersed in the disc.

## THALAMIFLORÆ. GROUP II. SECTION I.

Disc a torus or ring within the stamens; ovules 1-2 in each cell, pendulous, flowers regular.

FAMILY XV.—RUTACEÆ.

Flowers regular, perfect or unisexual. Calyx 4-5 parted or of 4-5 sepals, imbricate in aestivation. Petals 4-5. Stamens destitute of scale at the base, as many as the petals or twice as many, in which case those opposite the petals are more or less impotent, or staminodia. Disc a ring, or cushion-like. Ovary sessile or stalked, of 3-5 carpels which are free or coherent, or rarely of one carpel. Ovules 2 or 1; styles connate. Fruit capsular, berried, or of 3-5 cocci. Leaves simple, exstipulate, gland-dotted. The gland-dotted leaves are usually strongly and often disagreeably scented, and the leaves and bark are often bitter. The Buchu teas of Cape Colony and the various citrus fruits are products. Trees, shrubs and herbs.

42. **CALODENDRON.** Flowers in terminal many-flowered panicles, hermaphrodite, very showy; the peduncles several times trichotomously branched, the central one in each case terminal and 1-flowered. Sepals 5, small, green, ovate-acute, separate almost to the base. Petals 5, pinkish-white, widely lanceolate, 2-3 c.m. long, 5 m.m. wide, undulated, more or less woolly with stellate pubescence on both surfaces, especially on the back, and occasionally dotted with purple spots. Staminodia 5, petaloid, 3 c.m. long, 2-4 m.m. wide, pinkish-white spotted with purple glands, especially on the margin. Perfect stamens 5, as long as the petals; filaments slender, gland-dotted; anthers sagittate, glandular. Disc a small ring inside the stamens, and with a central gynophore. Ovary raised on the gynophore 5-lobed, 5-celled, cells 2-ovuled, style filiform, single, from between the lobes. Fruit a short-stalked, dry, woody, 5-celled somewhat angular capsule, 3 c.m. long and wide, with a much tubercled surface; dehiscence septicidal from below, the 5 valves remaining attached to the top of a central column and containing 2 superimposed seeds each. Seeds angular, black, 10-12 m.m. diameter.

**C. capense**, Thunb. *Vern. names*—1, Wild Chestnut; 13, Umbaba; 14, Wilde Kastanje. A large umbrageous tree with opposite, decussate, exstipulate, simple, ovate or ovate elliptical, glabrous leaves 8-12 c.m. long, 3-8 c.m. wide, and inflorescence as described above. I did not see this tree in the Province, nor is it included in the "Flora of Tropical Africa," but it is included here on the strength of Dr. Bolus' statement (*Official Handbook of the Cape, 1893, page 103*) that it has been met with on the Zambesi and even on the Kilimanjaro Mountain, a few degrees south of the equator; it is, however, not included in Miss Gibb's list of plants of Southern Rhodesia nor in Mr. D. E. Hutchin's Report on the Forests of Kenia, and I now think it probable that my own statement that "experiments are being made in East Africa to collect the seeds commercially for the expression of oil" is founded on mistaken identity, and should have referred to *Trichilia*. See "Forest Flora of Cape Colony," 153, and Plate XXI.

43. **CLAUSENA.** Flowers hermaphrodite, panicles axillary. Sepals and petals 4. Stamens 7-8, free, hypogynous, almost or quite equal; filaments free, subulate, anthers sagittate, opening by longitudinal slits. Ovary on a cylindrical torus, 3-celled; cells 2-ovuled; ovules collateral; style short, single, deciduous; stigma 3-lobed. Berry fleshy, 1-seeded. Leaves unequally pinnate.

**C. inaequalis**, Benth. *Vern. names*—4, Tchicandechaiwonde; 13, Um-nukambile; 15, Hlahlambit and Pehlaquati. A small tree, frequent throughout the Province, having alternate, imparipinnate leaves 7-12 c.m. long, foetid when bruised, with 5-15 unequal-sided leaflets alternate or sub-opposite on the rachis; 10-15 flowered panicles 5-7 c.m. long, with 1-3 flowered panicle branches, and small black 1-seeded berries. Seldom of timber size. See "Forest Flora of Cape Colony," page 152 and Plate XXVI. fig. 3.

44. **XANTHOXYLUM.** Flowers unisexual, diœcious, paniculate. Sepals and petals 4, spreading. Male flower—stamens 4; hypogynous; filaments slender, as long as the petals and alternate to them, erect; ovary rudimentary, pointed. Female flower—stamens absent, carpel solitary, oblique, 2-ovuled, with a short curved style and capitate stigma. Fruit dry, 1-celled, 1-seeded, tubercled with glands, dehiscent in 2 valves, retaining the shining black round pendent seed attached to the inner coat of the capsule and fully exposed or projected for some time after dehiscence. Seeds bony, aluminous. Leaves pinnate, alternate.

**X. capense**, Sim ("Forest Flora of Cape Colony," 155 and Plate XXIV.). *Vern. names*—1, Knobwood; 4, Um-hlungwaan; 5, 6, 7, 8, Nungwane; 13, Uni-nungumabele; 14, Paardepram. An exceedingly variable tree, frequent throughout South Africa, and also throughout the Province of Mozambique. In Cape Colony it forms a large and valuable timber tree with leaves 30 c.m. long, bearing 6-8 pairs of leaflets, and stems so set with large prickly-pointed corky knobs as to earn its name *Knobwood*, and this form was seen in Gaza, but smaller forms occur merging gradually into these. What were seen elsewhere in the Province had leaves about 5-foliate, 15 c.m. long; pinnules 5 c.m. long, widely lanceolate, crenate, bluntly pointed, tapering to the 1 c.m. petiolules, with or without prickles on the



rachis which is usually subtended by one prickles. Panicle 5-8 c.m. long, many-flowered, flowers 4-merous; fruit 2-valved, dehiscent, obovate, acute, 1-seeded, scarlet in coast specimens which are also firmly succulent. Stem set with sharp hooked prickles.

PLATE XVII. A. 1, Fruiting branch; 2, Panicle; 3, Male flower; 4, Tree, general aspect (much reduced).

For uses see "Forest Flora of Cape Colony."

45. **TODDALIA**. Flowers unisexual; calyx small, 4-lobed; petals 4, free. Male flower—stamens 8, with slender filaments inserted round the short gynophore bearing the abortive 4-angled pistil. Female flower—stamens small and abortive or absent; ovary shortly stalked, 4-celled; cells 2-ovuled, stigma sessile, discoid. Fruit leathery, indehiscent, 1-4 seeded, seeds albuminous. Leaves alternate, 3-foliate, exstipulate. Trees and shrubs.

**T. Lanceolata**, Lam. *Vern. names*—1, White Ironwood; 4, 15, Mbotane; 5, 6, 7, 8, Mooia and Moowelee; 13, Umzani. A glabrous tree, sometimes of large size and yielding valuable timber, concerning which see "Forest Flora of Cape Colony," page 157 and Plate XXII. Leaves digitately 3-foliate, or near the panicle 1-2 foliate; leaflets lanceolate, undulate, entire, 5-8 c.m. long, 1-3 c.m. wide, almost sessile, and jointed to the petiole. Flowers small, greenish, in much branched terminal panicles. Fruit 4-celled, when dry 4-lobed, 5 m.m. wide, usually 4-seeded. Frequent in the extra-tropical parts of the Province, though seldom so large as in Cape Colony and Natal; present also throughout the tropical districts of the Province.

PLATE XXV. C. 1, Fruiting branch; 2, Flower,  $\times 7$ ; 3, Cross section of ovary.

#### FAMILY XVI.—SIMARUBEÆ.

Flowers hermaphrodite or polygamous, regular; calyx 4-5 partite; petals as many; stamens as many or twice as many, filaments free; ovary syncarpous or lobed or of free carpels, inserted upon a fleshy thickened disc; ovules solitary or germinate. Leaves alternate, simple, 2-foliate or pinnate. Inflorescence various.

46. **KIRKIA**. Flowers hermaphrodite or polygamous, 4-merous; stamens 4, alternate with the petals; ovary small, 4-lobed, 4-celled; styles free; ovules solitary. Fruit dry, oblong, tetraquetrous, separating at length into four 1-seeded indehiscent cocci suspended by the apex from a central carpophore. Seeds exalbuminous.

**K. acuminata**, Oliv. A glabrous tree with alternate, exstipulate, multifoliate leaves 15-30 c.m. long, the leaflets 13-19, sub-opposite or alternate, obliquely lanceolate, pointed, serrulate, glabrous, 5-8 c.m. long, 1.5-2.5 c.m. wide, on short petioles. Flowers in numerous, pedunculate, cymose corymbs from the axils of the upper leaves, forming a broad leafy panicle. Fruit 1.5 c.m. long, 5-7 m.m. wide. Hook. Icon. Pl. 1036. Zambesia, at Lupata, and near Senna (Sir John Kirk).

47. **SURIANA**. Flowers hermaphrodite, 5-merous, yellow. Stamens 5, free, with hairy filaments, and 5 shorter, outer, without anthers. Carpels 5, free, each an indehiscent 1-seeded nut with a separate lateral style. Ovules geminate. Monotypic.

**S. maritima**, Linn. A much-branched pubescent shrub 2-4 metres high, with simple rather crowded oblanceolate, shortly petioled leaves 2-3 c.m. long, 3-4 m.m. wide, and few-flowered corymbs almost or quite terminal. Calyx 5 lobed, lobes acute. Petals rather longer, obovate with a short claw; open corolla 2 c.m. wide. Styles 5, 10 m.m. long. Abundant at Bartholomew Dias, where it forms a large proportion of the littoral scrub, but keeps beyond the tidal mud, growing on sand and rock alike. Also found at Mozambique and northward, near the sea.

PLATE XXV. B. 1, Flowering branch; 2, Flower,  $\times 2$ ; 3, Petal,  $\times 2$ ; 4, Stamens and pistil,  $\times 4$ ; 5, Stamen,  $\times 6$ ; 6, Pistil,  $\times 3$ .

48. **IRVINGIA**. "Flowers hermaphrodite. Calyx 5-partite; petals 5; stamens 10 inserted under a thick fleshy hypogynous disc; filaments filiform. Ovary ovoid, compressed, glabrous, inserted upon a broad disc; style simple; stigma simple; ovules solitary; fruit rather large, drupaceous 1-seeded; (? T.R.S.) pericarp woody or with fleshy epicarp. Glabrous trees. Leaves alternate, simple, entire, petiolate, with narrow, early deciduous, convolute stipules, leaving annular scars. Flowers yellowish, pedicellate, in terminal or axillary paniculate or fascicled racemes, ebracteate."

A Tropical African genus consisting of 2 West African species to which with some hesitation—especially in the absence of flowers—I add another, which differs from the generic description in having a 2-celled stone with a seed in each cell.



- I. (?) *mossambicensis*. (New species.)<sup>1</sup> *Vern. names*—10, 11, Tube and Tumble. A large tree with leaves ovate-elliptical, 5-8 c.m. long, 2-3 c.m. wide, firm, broadly pointed, rounded at the base, entire, glabrous when mature, with prominent midrib and numerous nearly parallel side veins. Coppice shoots have leaves 10-15 c.m. long, 4-5 c.m. wide, more cordate at the base, finely white-tomentose on the under surface, brown-woolly on the upper surface, but this wears off with age; probably on the trees this is so also, but the long bare stems render foliage almost inaccessible. Coppice shoots also show stipules 2 c.m. long, which, like the petioles and young growth, are covered with brown pubescence, and the leaves in bud have the margins rolled outward. Older wood and fruit covered with white lenticels. Fruit terminal, showing no vestige of style or calyx, oblong, 3-4 c.m. long, 2-3 c.m. diameter, having a firmly fleshy edible epicarp and a hard bony 2-celled stone, each cell lined with an abundant silky wool, and containing 1 erect oily-albuminous seed. Flowers and inflorescence not seen; in the absence of these the generic position of this tree remains uncertain. Tree 20-30 metres high with clean straight valuable timber stem; fruiting very abundantly; the fruits readily eaten by the monkeys, and when they fall by the natives, rather sweet, not quite a table fruit but acceptable to the weary traveller. See Chap. IV. Frequent in the forests of Quelimane, Magenja da Costa and Nhamacurra, usually of timber size; young trees scarce. Sim 5622.

PLATE XXX. A.

Mention is made in "Flora of Tropical Africa" of a climbing shrub from the Rovuma River, represented at Kew by an incomplete specimen, but which is taken to belong to *Balanites*, a genus belonging to this Family, and which has axillary or supra-axillary spines, 2-foliate leaves, axillary fasciculate or cymose inflorescence, hermaphrodite flowers, 5 sepals, 5 petals, 10 stamens, a 5-celled ovary with solitary ovules and a 1-seeded drupe with bony putamen.

#### FAMILY XVII.—MELIACEÆ.

Flowers regular, imperfect or perfect, polygamo-dioecious. Calyx small, 5-fid, imbricate; petals 5, free. Stamens hypogynous, 8-10, the filaments more or less connate, anthers dehiscing longitudinally. Ovary free, 3-12 celled; ovules 2, collateral, or more; style single; stigma capitate. Fruit a capsule or berry. Leaves alternate, exstipulate, simple or variously pinnate; flowers in axillary clusters or panicles. A large Family, common to the warmer regions of both hemispheres.

49. *TURRÆA*. Flowers perfect, terminal on short branches or axillary, white or yellowish. Calyx cup-shaped, 5-toothed; petals 5, free, club-shaped; staminal tube cylindrical, usually slender; anthers 10, sessile. Disc none. Ovary oblong, 5 or more-celled; style rather longer than the staminal tube, filiform; stigma oblong, wider than the style. Ovules 2, collateral. Capsule leathery, wider than long, 5-lobed, 5-celled, 10-seeded; dehiscence septicial, the bright red compressed reniform seeds remaining attached to a central column. Seeds albuminous. Leaves alternate, exstipulate, simple, entire or lobed. Trees and shrubs, mostly tropical.

- T. *nilotica*, Kotschy & Peyr. *Vern. names*—6, Sungrukur; 10, Morothe. A shrub or small tree having leaves widely lanceolate, elliptic or oblong-acute, tapering to both ends 10-18 c.m. long, 5-8 c.m. wide, tomentose under, and with petiole 1-2 c.m. long. Pedicels 1.5-3 c.m. long, in axillary umbels of 6-12, on a 5-7 m.m. peduncle; flowers 2 c.m. across; petals oblong, 2 c.m. long; staminal tube 1.5 c.m. long, densely hairy in the throat; stamens at first exserted and erect, afterwards bent back, starlike, within the lobes which are blunt and bifid when young. Style 2.5 c.m. long, ovary about 10-celled. Mature fruit not seen, young fruit globose, finely pubescent. Not common, but seen in M'Chopes (extra-tropical), Magenja da Costa and Nhamacurra.

PLATE XVIII. A. 1, Flowering branch; 2, Portion of top of staminal tube,  $\times 2$ ; 3, Stamen,  $\times 4$ ; 4, Lobes of staminal tube,  $\times 4$ ; 5, Stigma,  $\times 10$ .

- T. *cylindrica*. (New species.)<sup>2</sup> *Vern. names*—6, Duinyoka or Duitcha-nuka. Tree 10 metres high with stem up to 30 c.m. in diameter. Leaves widely lanceolate, tapering to both ends, 5-8 c.m. long, 2.5-3 c.m. wide, glabrous except for tufts of hairs in the axils of the veins on the under surface. Flowers in very short

<sup>1</sup> *Irvingia* (?) *mossambicensis*. (Nov. sp.) *Arbor magna: foliis ovato-ellipticis, 5-8 c.m. longis 2-3 c.m. latis, rigidis, late mucronatis, basi rotundatis, integris, maturis glabris, costa prominente, venis multis subparallelis, ramorum virgultorum foliis 10-15 c.m. longis 4-5 c.m. latis, basi subcordatis, marginibus in germine revolutis, subtus albotomentosis supra fusco-lanosis demum glabris; stipulis 2 c.m. longis, fusco-pubescentibus. Ramis vetustioribus et fructibus lenticellis albis notatis. Inflorescentia floribusque haud visis. Fructibus apicalibus, nec stylo nec calyce praeditis, oblongis 3-4 c.m. longis 2-3 c.m. latis, mesocarpio carnosio esculento, endocarpio osseo biloculari semina duo erecta continente, albumine oleoso. In silvis frequens; Quelimane, Magenja da Costa, Nhamacurra. Tab. XXX. A.*

<sup>2</sup> *Turraea cylindrica*. (Nov. sp.) *Arbor 10 m. alta, caule 30 c.m. diam. Foliis late lanceolatis, 5-8 c.m. longis 2.5-3 c.m. latis, glabris nisi venarum axillis in facie inferiore pilosis. Racemis florum bracteatis perbrevibus axillaribus; pedicellis 2-3 c.m. longis; petalis ligulatis 4-5 c.m. longis, flavis; tubo staminali 4-5 c.m. longo, lobis subulato post antheram quamque; stylo tubo longiore; ovario circa 10-oculari; fructu oblongo, 1.5 c.m. longo, subacuto, carinato. Haud frequens; M'Chopes, Inhambane, Beira, Quelimane, Magenja da Costa, Nhamacurra. Tab. XVIII. B.*

axillary and bracteate racemes; pedicels 2-3 c.m. long; calyx 3 m.m. long; petals strap-shaped, 4-5 c.m. long, yellow; staminal tube 4-5 c.m. long, with a subulate lobe behind each anther; style longer than the tube; ovary about 10-celled; fruit 1.5 c.m. long, oblong, shortly pointed, ribbed. Present but not common in M'Chopes and Inhambane (extra-trop.) and at Beira, Quelimane, Magenja da Costa and Nhamacurra. Sim 373.

## PLATE XVIII. B.

50. **MELIA.** An exotic genus of which the one species here included is now naturalised in almost all tropical and sub-tropical localities. Calyx 6-partite; petals 6; stamens 10-12, monadelphous; ovary 3-6 celled, ovules 2 in each cell, superposed. Fruit drupaceous, with a 1-5 celled bony putamen. Leaves alternate, 2-3 pinnate. Flowers in large panicles.

**M. Azedarach**, Linn. *Vern. name*—1, Syringa. A tree 10-20 metres high, up to 60 c.m. diameter of stem, with useful half-hard white clean timber of rapid growth. Leaves deciduous or nearly so, 2-pinnate, with incised leaflets. Panicles abundant, flowers scented, lilac; berries very abundant, whole tree said to be poisonous. Naturalised throughout the Province, but less prosperous at Quelimane and northward than in the south.

51. **EKEBERGIA.** Inflorescence paniculate; panicles numerous, placed singly in the axils of the new season's leaves, and thus crowded at the ends of the branches. Flowers polygamous or apparently hermaphrodite, jointed to the pedicels. Calyx irregularly 5-fid; petals 5, imbricate in bud, slightly adnate at the base to the staminal tube; stamens 10, their filaments united into a tube, on the margin of which stand the anthers; ovary sessile, surrounded by a ring, 2-5 celled; cells 2-ovuled; style short; stigma discoid or somewhat 2-lobed. Berry fleshy *indehiscent*, 2-5 seeded. Seeds pendulous, without arillus, exalbuminous, with superior radicle. Leaves alternate, imparipinnate.

**E. Meyeri**, Pr. *Vern. names*—1, Cape Ash, and Dog Plum; 4, Nyanuja; 13, Umgwenya-uizinja. An evergreen tree, often forming a large and useful timber tree in the mountain forests of Natal, but seen only as a low flat tree 3-5 metres high in this Province. Leaves 20-30 c.m. long, with 4-5 pairs of leaflets and terminal one; leaflets 7-10 c.m. long, 2.5-4 c.m. wide, acute, glabrous, entire, unequal at the base, the upper side the larger; petiole 5-15 m.m. long; panicle 15-20 c.m. long, many flowered. Corolla both sides, and staminal tube pubescent; tube undivided, with 10 anthers on its margin. In fertile flowers the ovary is short and stout with 2 sessile stigmas; in barren flowers the ovary is abortive, style slender and stigma capitate. Ovary 5-celled, fruit 2-5 seeded, fleshy indehiscent 1-2 c.m. diameter, seeds pendulous, 1 c.m. long. This species is too near *E. capensis*, Sparm., of Cape Colony, and Oliver considers the Abyssinian *E. Rüppeliana*, Rich., as doubtfully distinct.

PLATE XX. 1, Leaf and panicle; 2, Flower,  $\times 7$ ; 3, Flower, petals removed,  $\times 5$ ; 4, Stamen,  $\times 10$ ; 5, Disc and calyx and abortive pistil,  $\times 5$ ; 6, Calyx, with fertile pistil,  $\times 7$ ; 7, Fruit; 8, Section of ovary; 9, Seed; 10, Tree, general appearance.

52. **TRICHILIA.** Inflorescence shortly paniculate in the upper axils; flowers sometimes imperfect diœcious. Calyx 5-toothed; petals 5, free, imbricate in aestivation; stamens 8-10; filaments united half way; anthers introrse; ovary usually 3-celled; cells 2-ovuled, stigma capitate; capsule 3-celled, woody, dehiscent, 6-seeded. Leaves alternate, imparipinnate in our species. Seed exalbuminous; radicle upward.

**T. emetica**, Vahl. *Vern. names*—1, Cape Mahogany; 2, Mafurreira; 4 to 8, the Portuguese name *Mafurreira*, or various alterations of the Kaffir name (13) *Umkuhlu*, such as Nkusu, Tunhlu, Umcuchô, Kuhlu, &c.; 10, Muteri and Moreka; 11, Mutumbe; 14, Esschenhout. The fruit is known to most natives by the Portuguese name Mafura. A large, evergreen, umbrageous tree; leaves imparipinnate of 3-5 pairs of leaflets and a terminal one, 15-30 c.m. long, 15-22 c.m. wide; the leaflets opposite, lanceolate-oblong or oblong, acute or obtuse, entire, glabrous, shining, dark green above, green or pubescent below, 8-12 c.m. long, 4-5 c.m. wide, on short swollen petiolules. Flowers numerous on short clustered axillary panicles, forming together a large much-branched or clustered terminal leafy panicle. Flowers scented, usually (or always) imperfectly diœcious, some trees having only potent stamens and others only potent pistils in flowers which appear hermaphrodite, the result being a heavy crop of fruit annually on the fertile trees and never any on the others. Flower 2 c.m. across, 1.5 c.m. deep, staminal tube cylindrical, hairy upward, shortly 10-toothed, each tooth bearing an extrorse anther set in hairs. Pistil approximately the same length as the staminal tube, but varying in length, possibly in connection with potency. Fruit leathery, globose or nearly so, 2-2.5 c.m. diameter, 3-valved, 6-seeded or fewer. Seeds black, 1.5 c.m. long with scarlet arillus, from which, as also from the seed, oil is obtained in quantity, making this one of the most useful trees in the Province. The Portuguese name of the fruit, Mafura, means oil, and one of the synonyms of this tree is *Mafureira oleifera* (Bert. Misc. Bot. IX. 6, t. 2). Distributed abundantly throughout the Province south of Inhambane, both on the sandy ground and on the alluvial river flats, present also in the tropical parts of the Province, though less abundant and hardly used

there for its oil product. It occurs also on the Upper Zambesi, White Nile, Abyssinia, Sierra Leone, Senegambia, &c., as also in Natal and Eastern Cape Colony. For its timber see Chap. IV., for its oil see Chap. V., and for further information see "Forest Flora of Cape Colony," page 60 and Plate XXVII. Its bark is stated to be poisonous, but the natives of this Province do not appear to be aware that it is so.

PLATE XV. 1, Leaf; 2, Flowering branch; 3, Flower; 4, Pistil,  $\times 2$ ; 5, Staminal tube, opened out,  $\times 2$ ; 6, One anther, *in situ*,  $\times 5$ ; 7, Fruit, open; 8, Seed; 9, Tree, general aspect (reduced).

**T. capitata**, Klotzsch (in Peters' Mossamb. Bot. 120). "Extremities pubescent. Leaves 9-15 foliate, 9-12 in. long, pubescent or at length nearly glabrous at least above; leaflets alternate or sub-opposite ovate or ovate lanceolate, acute or acuminate, base rounded, sometimes broadly, more rarely cuneate, obscurely undulate crenate or sub-entire,  $1\frac{1}{2}$ -3 in. long or the lower about 1 in.,  $\frac{3}{4}$ -2 in. broad; petiolules 1 line more or less. Flowers  $1\frac{1}{2}$ -2 lines, in pedunculate axillary corymbose or sub-capitate cymes, with the peduncle (when elongate usually unbranched below)  $\frac{1}{2}$ -4 in. long. Calyx 5-fid. Petals imbricate. Filaments united about  $\frac{1}{4}$ , deeply 2-fid at the apex, the subulate teeth rather shorter than the anthers. Disc free. Ovary probably 3-celled with geminate ovules. Fruit globose,  $\frac{1}{2}$ -in. or less in diameter, dehiscing in 3 or 2 valves. Seeds 6 or fewer. Zambesi and Shire, Drs. Kirk and Meller! Peters!" Unknown to me, but several trees more or less answering the above leaf description were seen without flowers or fruit and it may have been one of them as it is included also in the list of plants found in Gaza, in "Gaza" (by Capt. Gomes da Costa, 1897-1898, Lisboa). One of these known as (4 and 6) Shimbunkanye, found abundantly along the Umbelusi, Lourenço Marques, and seen also in M'Chopes, has a most extraordinary development of brown wool upon the roots underground, and is on that account credited by the natives with marvellous powers of preventing snake-bite, goat-sickness, &c., but in the absence of flowers or fruit it was impossible to identify it.

53. **CARAPA**. Glabrous trees with pinnate leaves, small flowers in cymose axillary panicles, and very large fruits. Calyx 4-lobed; petals 4; stamens monadelphous; anthers 8; ovary about 4-celled, with several ovules in each cell. Capsule large, woody, opening in 4 valves. Seeds large, angled by pressure.

**C. moluccensis**, Lam. *Vern. name*—10, Mutanameda. A glabrous evergreen tree, abundant in tidal mud in all the rivers at and north of Quelimane. Leaves alternate, 1-2-3 jugate; leaflets elliptical, rounded at the apex, shortly petiolate, the rachis having a point beyond the upper pair. Raceme few-flowered, 5 to 10 c.m. long. Calyx tubular, with 4 rounded teeth; petals oblong; staminal tube white, bell-shaped, widest below, 3-5 m.m. long, with 8 2-fid teeth and with an anther inside at each sinus. Ovary conical, surrounded by an attached disc, about 4-celled and with several ovules in each cell. Fruit 4-celled, ultimately dehiscent, when the are not present on the mature plant. Leaves and stem of seedling plant have peltate scales; these

PLATE XVI. 1, Leaf branch; 2, Inflorescence; 3, Flower,  $\times 2$ ; 4, Calyx,  $\times 2$ ; 5, Petals,  $\times 2$ ; 6, Staminal tube,  $\times 8$ ; 7, same, opened,  $\times 5$ ; 8, Anther,  $\times 5$ ; 9, Pistil,  $\times 5$ ; 10, Section of same, showing ovary; 11, Transverse section of ovary; 12, Young fruit; 13, Transverse section of same; 14, Seed; 15, Cotyledons as found in seed; 16, Tree, general aspect (reduced).

PLATE LXXXIX. Fig. 1, Seedling plant.

54. **KHAYA**. Sepals 4; petals 4; stamens 8, monadelphous; tube with 8 rounded lobes; anthers included. Ovary 4-celled, surrounded by an annular disc; ovules about 12 in each cell. Capsule woody, dehiscent; seeds albuminous, about 12 in each cell, flat, shaped by compression. Leaves abruptly pinnate.

**K. senegalensis**, A. Juss. *Vern. names*—2, Mogno (=Mahogany); 10, Monondwe and Mbowa. A very large glabrous, evergreen tree, present but not common throughout all the forests north of the Zambesi, and stated to occur also in the tropical forests south of the Zambesi; usually growing near a stream. Owing to its long clean stems I failed to obtain normal leaves; that drawn is from a coppice shoot. Leaves abruptly pinnate, 4-10 foliate, 15-30 c.m. long or longer; with no terminal leaflet though the upper one sometimes appears so; leaflets opposite, sub-opposite or alternate, elliptic or elliptic lanceolate, acute, rounded or tapering at the somewhat oblique base; petiole 7-14 m.m. long. "Panicles shorter than or nearly equalling the leaves, with ascending or spreading lateral branches decreasing in length from below. Flowers cymose, usually in 3's, or peduncles trichotomous. Pedicels shorter than the flower. Bracts minute, ovate-deltoid." Fruit 5 c.m. long, 4 c.m. diameter, the 4 woody valves splitting apart round the central woody 4-winged axis, each cell having about 12 seeds in 2 rows. Sim 5547. Occurs also in West Africa and on the White Nile.

PLATE XXI. 1, Part of leaf; 2, Open fruit, 2 valves and seeds removed; 3, Seed.

#### FAMILY XVIII.—OCHNACEÆ.

As represented in the Province answers the description of the only local genus.

55. **OCHNA**. Flowers yellow, shortly peduncled, single, or clustered, or in racemes, mostly on short lateral branchlets. Sepals 5, yellowish, persistent, imbricate; petals 5, free, caducous. Disc cushion-like, enlarged after flowering. Stamens many, with slender filaments and oblong anthers dehiscing either by terminal pores or



longitudinally. Style single, central on the disc, the 4-6 ovary-lobes arranged around its base, each 1-celled, 1-ovuled, and after fertilization appearing as 4-6 separate black drupes resting apart upon the red enlarged torus, and the calyx often turns red also. Seeds albuminous. Leaves alternate, simple, stipulate; stipules deciduous. Owing to variable characters the species are difficult to separate. A large tree from Magenja da Costa known as *Nakrokwe*, seen only with immature flowers, may belong here or to *Uvaria*.

- O. arborea**, Burch. *Vern. names*—1, Redwood and Cape Plane; 4, Mzenzan and Shukwa; 13, Umtensema, Umhlethane and Umtelele; 14, Roodehout; 15, Shimushwan. A small tree 4-12 metres high, usually having a small crown and a clean unbranched stem 15-30 c.m. diameter with a thin white or brownish smooth bark, from which scales flake off. Leaves oblong, entire or few-toothed, coriaceous, 5-7 c.m. long, 1-2 c.m. wide, usually obtuse, very shortly petiolate; flowers produced abundantly, singly or in racemes or clusters, often from abortive branchlets. Anthers dehiscing by terminal pores. Frequent in the extra-tropical districts; yields a dense, close-grained, light red, durable timber in Cape Colony and Natal, where it is used for various purposes. Cone-like galls often occur instead of buds. Leaves generally more serrate than in Natal.

PLATE IV. B. 1, Fruiting branch; 2, Flower,  $\times 2$ ; 3, Stamens and pistil (magnified); 4, Fruit; 5, Gall.

- O. mossambicensis**, Klotzsch. *Vern. name*—10, Na-noa. A shrub, having obovate, finely serrulate, shortly petiolate leaves 12-17 c.m. long, 5-8 c.m. wide, and the flowers in lateral pedunculate corymbose racemes. Anthers opening by pores. Throughout the Province.
- O. atropurpurea**, D. C. var. *Natilitia*. *Vern. name*—15, Mtuse. A tree with lanceolate, undulate, sharply serrulate leaves 5-7 c.m. long, 1-2 c.m. wide. Flowers in short lateral racemes, anthers opening by pores. Delagoa Bay, M'Chopes and Inharreme.
- O. Kirkii**, Oliv. *Vern. names*—10, Ka-mulugaim; 11, Nequaka. A large glabrous tree in the forests of Magenja da Costa. Bark very rough. Leaves obovate-elliptical to oblanceolate-oblong, 5-7 c.m. long, 1-2 c.m. wide, sometimes cordate at the base, finely serrulate, prominently and irregularly veined above, pale below. Resting buds abundant. Flowers not seen; said to be in terminal or lateral pedunculate, umbellate corymbs, and with anthers dehiscing by short slits. Recorded also from Rovuma.
- O. macrocalyx**, Oliv. A small shrub from Zambesia and northward having serrulate, oblanceolate-oval, sub-acute leaves 7-10 c.m. long, 2-3 c.m. wide; short axillary 3-7 flowered racemes; flowers large; pedicels 2.5 c.m. long, fruit sepals 2-2.5 c.m. long. Anthers dehiscing by pore-like slits.

#### FAMILY XIX.—BURSERACEÆ.

Flowers hermaphrodite or polygamo-dioecious; calyx 3-4-5 lobed or partite, petals 3-5; stamens 6-8-10, inserted on the margin or on the outside of a fleshy disc more or less attached to the calyx tube; ovary free, 2-5 celled; ovules geminate; fruit drupaceous or capsular; seeds exalbuminous. Trees and shrubs with alternate, exstipulate, 3-foliate or imparipinnate leaves and small axillary paniculate, racemose or fascicled inflorescence. To this Family belong several of the resin-bearing trees of Somaliland, and I think it probable that several large deciduous pinnate-leaved trees having more or less flaky bark, and found by me in Zambesia without flowers or fruit and almost without leaves may also belong here. *Canarium*, a West African edible fruit, is mentioned in "Gaza" as found there, but I have no other information that it is so.

56. **COMMIPHORA**. Flowers polygamous. Calyx companulate or deeply 4-toothed, persistent. Disc almost absent or adnate to the calyx and more or less cup-shaped, bearing the 4 perigynous valvate petals and 8 stamens on its margin. Filaments slender, free, alternate stamens slightly shorter. Pistil rudimentary in most flowers. "Ovary 2-3 celled, narrowed into a short thick style; stigma obtuse, undivided, or margins lobulate. Ovules geminate, collateral, pendulous." Drupe ovoid or sub-globose, usually 1-seeded, the leathery or somewhat succulent mesocarp dehiscing in 2 valves, exposing the black bony putamen, the lower half of which is girt by a bright red aril-like tissue; seeds exalbuminous. Cotyledons plicate. Leaves 1-3 foliate or pinnate, deciduous, usually the first leaves on new shoots are 1-foliate, the number of leaflets increasing up the stem. 5-merous flowers are occasionally intermixed in the same inflorescence among the normal 4-merous flowers. Timber very light, white; bark usually separable in horizontal flakes, leaving a shining green surface. A difficult group to limit in regard to species, and the natives confuse the species considerably in the use of the common names. In the absence of literature on the *Commiphoræ* I do not feel justified in naming the species which are new to me, and consequently refer to them by numbers. Possibly the "Shumbunkanye" referred to under *Trichilia Capitata* belongs here—(6) *O-deba* or *Diva*. All the species strike by stump-cuttings and are planted for hedges, shelter, &c.

- C. africana** = *Balsamodendron africanum* Arn. in Ann. Nat. Hist. III. (1839) 87. Flowers in axillary fascicles, mostly on short leafy spine-branches. Leaves 1-3 foliate, leaflets 2-3 c.m. long, 1-2 c.m. wide, nearly sessile, obovate or oblanceolate, cuneate at the base, blunt or acute, crenate or nearly entire. Fruit globose or obovoid,



almost sessile, 1 c.m. long, red, with a marked aril. Said to be the source of the gum known as African Bdium. There are at least 2 varieties, viz. :—

(a) *Normalis*. Vern. name—10, Na-loa. More or less pubescent; leaves obtuse, crenate-serrate.

(b) *Abyssinica*. Vern. names—4, Chessengue; 15, Imbendong. Glabrous; leaves more narrow and acute, not deeply crenate, 1.3-5 foliate.

Var. *normalis* is frequent as a shrub or small tree north of the Zambesi, and var. *abyssinica* is abundant throughout the southern half of the Province, and is often planted as an exceedingly rough spinose hedge. The fruit is eaten in Magenja da Costa as a stomach medicine. Trees seen at Umbelusi (Sim 6225), and which had the same fasciculate inflorescence were rather large trees, abundantly spinose, with leaves 1.3-5 foliate, and were named Chessengue-inkomo by the natives.

**C. mossambicensis**, = *Protium* (?) *mossambicense*, Oliv. ("Flora of Tropical Africa," l. 329). "Leaves 3 foliate, rarely sub 5-foliate, at length glabrescent; leaflets broadly ovate-rotundate, broadly pointed, sub-acute or obtuse, entire or faintly undulate; median 3-3½ in. long, 1½-3 in. broad, on a petiole of ¾-1½ in., lateral 1½-2 in. long and broad, on petiolules of ¼-½ in. Fruits racemose from the axils of fallen leaves, broadly ellipsoidal or sub-globose, about ½ in. in length; epicarp tardily 2-valved." Described by Prof. Oliver from specimens sent from the Zambesi by Sir John Kirk, in fruit only; it is unknown to me but is included in the list of Gaza plants in Capt. Gomes da Costa's "Gaza."

**C. caryæfolia**, Oliv. Vern. names—1, Corkwood; 4, Shumbu n-kanye; 10, M-tula<sup>1</sup>; 13, Hlunguti. Flowers sessile in lax spikes 6-10 c.m. long, axillary to the lower leaves on young branches, or below them. Leaves deciduous, 20-45 c.m. long, imparipinnate, 7-9 foliate (or up to 21-foliate?); leaflets oblong-lanceolate, rounded at the base, acute, 7-12 c.m. long, 2.2-5 c.m. wide, crenate serrate, villose and stellate canescent when quite young, afterwards glabrous, coriaceous, and turning yellow before they fall. Resting bud set with acute scales; spikes produced from among these scales, often before the leaves appear, or axillary to the lower leaves. Calyx cut less than half way, lobes acute, disc attached to its cup; petals perigynous, short, acute; stamens short, perigynous; ovary usually rudimentary. Drupe 2 c.m. long, 1 c.m. diameter, green, dehiscent showing a red pseudo-aril. A very large tree with rough bark and timber light enough to be used for floats in fishing, and as brake-blocks, &c. See "Forest Flora of Cape Colony," page 158 and Plate XXV. Frequent throughout the Province. At Arenga (Magenja da Costa) the leaves are used as a poultice on sores. It is possible that the multifoliate tropical form is a separate species, and another form with entire leaflets may also be specifically distinct.

**C. Harveyi**, Engl. Vern. names—1, Corkwood; 4, Chessengue-m-kanye; 6, Diva, Mumbu, Tchaikanyakanyan; 7, Chirol or Chival; 10, N'Illovo; 12, Shrituana; 13, Hlunguti; 15, Mkonyakon. A glabrous tree, sometimes of large size, more often squat and branched from a huge base. Leaves deciduous, 7-15 c.m. long, 5-7-9 foliate; leaflets widely lanceolate, 5-8 c.m. long, 1-3 c.m. wide, tapering to the point, crenate-serrate, of thin texture, and turning yellow before they fall in autumn; resting bud set with acute scales. Panicles axillary on the young wood, diffuse, 10 c.m. long, 3 c.m. wide, its branches 1-2 c.m. long, each subtended by a leafy bract. Flowers shortly petioled, 5 m.m. long and wide; calyx deeply 4-lobed, the segments lanceolate; disc almost absent; petals perigynous, oblong, acute, whitish, expanded; stamens 8, the alternate slightly shorter. Ovary usually rudimentary; perfect ovary not seen. Drupe 10-15 m.m. long, 10 m.m. diameter, green, dehiscent showing a red pseudo-aril. Old bark very smooth, green, peeling off in thin paper like sections. Frequent throughout the Province, as also in Natal and Eastern Cape Colony. See "Forest Flora of Cape Colony," page 158, Plate XXV. fig. 4, where, however, the panicle is congested, whereas the most common form in this Province has a very lax panicle.

**Commiphora species, No. 1.** (Sim 6395.) A medium-sized glabrous tree, found in the forests of Quisica, as also at Lourenzo Marques, having flaky green bark, soft limber, alternate 5-7 foliate leaves with sessile, finely crenate, thin, obovate acute leaflets 3-5 c.m. long, 1-1½ c.m. wide, and axillary panicles 6-10 c.m. long, branched at the top only; flowers not seen; fruits abundant, rostrate, 1½ c.m. long, 8 m.m. diameter, greenish, 1-seeded, dehiscent with 4-nate calyx remaining; seed black, without evident aril.

**Commiphora species, No. 2.** (Sim 5915.) Vern. names—10, Mamatula and N'illovo. A medium sized pubescent tree found near Arenga, Magenja da Costa, having 11-15 foliate leaves with sessile, crenate, firm, elliptical, pubescent leaflets 3 c.m. long, 1 c.m. wide, and axillary wooly panicles in the upper axils, the panicles 10 c.m. long and branched at the top only; fruit almost sessile, globose, 1 c.m. long, with 4-nate calyx remaining. Axillary spines often present.

**Commiphora species, No. 3.** (Sim 5996.) Vern. name—10, Periveri. A small glabrous tree with 11-13 foliate leaves about 45 c.m. long, the leaflets sub-opposite or alternate, shortly petioled, obliquely lanceolate, acute, undulate, entire, 15-20 c.m. long, 3-4 c.m. wide and abundant axillary panicles 45 c.m. long, much branched, many flowered. Flowers not seen; fruit oblong, 1 c.m. long, almost sessile (dehiscent?). Found near Maquebella, Magenja da Costa.

<sup>1</sup> The name M-tula is used for *Sclerocarya caffra*, and it is possible that it was given to *Commiphora* through mistaken identity, as the leaves are somewhat similar.

## THALAMIFLORÆ. GROUP II. SECTION 2.

Disc various. Ovules 1-2 in each cell, ascending; flowers often irregular, unisexual or polygamous.

## FAMILY XX.—CHAILLETIACEÆ.

Flowers usually hermaphrodite. Calyx 5-partite; petals 5, free, clawed, 2-fid. Stamens 5; hypogynous glands 5, opposite to the petals. Ovary free, 3-2 celled; style simple, apex shortly 3-2 fid. Fruit drupaceous, 1-3 celled, 1-3 seeded. Small trees or shrubs with alternate, entire, petiolate or sub-sessile leaves and deciduous subulate stipules. Flowers small, white, in axillary cymes or glomerules.

57. **CHAILLETIA**. Characters as given for the Family.

**C. mossambicensis**, Klotzsch (in Peters' Mossamb. Bot. 108, t. 19). Leaves obovate-elliptical or oblong, cordate at the base, mucronate, with scattered hairs on the upper surface and pubescent under surface, 7-15 c.m. long, 4-6 c.m. wide. Cymes pedunculate. Ovary villous, 3-celled. Northern districts.

**C. reflexa**, Klotzsch (in Peters' Mossamb. Bot. 109, t. 20). Shrub, at first tomentose, becoming glabrescent with age. Leaves elliptic-oblong acute, rounded at the base, 4-6 c.m. long, 2-3 c.m. wide. Cymes almost sessile. Ovary 2-celled. Fruit oblique, pubescent, 1-celled, 1-seeded. Northern districts.

## FAMILY XXI.—OLACINEÆ.

Flowers regular. Calyx 4-5 lobed; petals 5, more or less connate at the base or free; stamens 5, alternate to the petals and more or less adnate to their tube. Disc cup-shaped, rarely unilateral or absent. Ovary free, 1-celled with geminate ovules, or spuriously 3-5 celled, with 1 ovule in each cell. Fruit 1-celled, 1-seeded, dry or drupaceous, indehiscent. Seeds albuminous. Trees or shrubs with alternate, entire, exstipulate leaves and small flowers.

58. **XIMENIA**. Calyx free, unchanged in fruit. Petals 4, free, hairy within, valvate in aestivation. Stamens 8-10, free, hypogynous. Drupe fleshy, with a bony 1-seeded nut.

**X. caffra**, Sond. *Vern. name*—4, Tondeluka. A shrub or small tree, with tomentose divaricate branches, and axillary branchlets ending in spines. Leaves elliptical, obtuse, at length glabrous, 3-4 c.m. long; peduncles axillary, 1-flowered; petals very hairy inside; fruit oval, glabrous, 1-2 c.m. long, red, edible. Abundant on the Lehombo range, and not uncommon through Lourenço Marques district.

**X. americana**, Linn. *Vern. name*—4-15, Kolotchan. A glabrous shrub with short spinose axillary branchlets. Leaves oval-oblong, obtuse, 2-5 c.m. long, 2-3 c.m. wide. Flowers in few-flowered cymes. Petals hairy inside; fruit 2-3 c.m. long, scarlet, edible. Frequent throughout the Province, as also in other parts of Tropical Africa.

59. **OLAX**. Calyx accrescent. Petals 5-6. Stamens 8, of which 3 are without anthers. Ovary free, 3-celled below, 1-celled above; ovules 1 in each cell. Glabrous shrubs or small trees, with alternate entire leaves and axillary or racemose inflorescence.

**O. dissitiflora**, Oliv. A glabrous shrub with lanceolate, coriaceous, shortly-petioled leaves, 2-3 c.m. long, 1-2 c.m. wide. Flowers in short axillary racemes or axillary in the lower part of leafy ramuli. Fertile stamens opposite the petals. Stigma 3-capitate, 3-lobulate. Zambesia.

60. **OPILIA**. Petals 4-5, hypogynous; stamens as many as the petals and opposite to them; Ovary 1-celled, 1-ovuled; racemes at first catkins; fruit drupaceous. Leaves coriaceous, alternate, entire.

**O. amentacea**, Roxb. An almost glabrous shrub or small tree, with oval-oblong, or lanceolate, somewhat cuneate, entire, shortly-petiolate leaves; catkins 1-2 c.m. long, 1 or several together, expanding to racemes; fruit 1-2 c.m. long oblong. Frequent at Lourenço Marques, and found occasionally throughout the Province. A probable second species is mentioned in "Flora of Tropical Africa."

61. **APODITES**. Calyx 4-5 toothed; petals 5, glabrous, valvate, free or slightly connate at the base. Ovary free, obovate, with an oblique style, the ovules on the same side of the ovary as the style, but on opposite sides of the placenta. Drupe 1-celled, 1-seeded, usually fleshy near the coast, leathery inland, horizontally elliptical, compressed, very oblique, and with a callous heel resembling an abortive second cell. Leaves alternate.

**A. dimidiata.** *Vern. names*—1, White Pear; 3, Witte Peer; 4, Tremati; 13, Um-dekana; 15, Umbontan. A valuable, almost glabrous, evergreen timber tree, widely dispersed over Africa, reaching its best development in the mountain forests of Cape Colony, and here usually a small coast tree. Leaves shortly petioled, ovate or elliptical, rounded or bluntly pointed at the apex, entire, glabrous, shining above, 3-4 c.m. long, 1-3 c.m. wide. Flowers profusely borne, mostly in terminal panicles, white, sweetly scented, nearly sessile, about 5 m.m. wide when full open, the petals being afterwards recurved, and dehiscing together by a horizontal slit just below their point of connection. Drupe 1 c.m. long, 7 m.m. diameter, very oblique, black and somewhat fleshy, with a red heel when fresh, grey and ribbed when dry. For timber qualities and illustration see "Forest Flora of Cape Colony," page 135, Plate XI. Frequent in the sand dunes along the coast, frequent on the Lebombo though seldom of large size, and present in all forests throughout the Province.

FAMILY XXII.—SAPINDACEÆ.

Flowers often irregular, unisexual or polygamous. Sepals 4-5, free or more or less connate, often unequal, imbricate. Petals 4-5 or absent, free, equal or unequal, imbricate in aestivation. Disc usually present, often unilateral. Stamens 4-8, usually free, sometimes unilateral, straight or declined. Ovary central or eccentric, 2-6 celled, ovules 1-2 in each cell, ascending. Fruit capsular or indehiscent, very various, simple or more or less deeply lobed. Seeds round, compressed or winged, with or without aril, albuminous or exalbuminous. Leaves usually alternate and exstipulate, simple, 3-foliate, or pinnate; embryo usually curved. A bitter or acrid principle is often present in the Family; some species are poisonous, others have edible fruits, some yield valuable timber, and from the covering of the seeds in some species of *Sapiindus* soap is obtained. Rather a heterogeneous group. An erect shrub with pinnate leaves and 15-21 sub-opposite or alternate oblong leaflets 2-3 c.m. long, known as *Mbrunya* at Arenga, Mageria da Costa, probably belongs to this Family, but no flowers or fruit were seen. A decoction of its ground fresh leaves is used to wash fishing lines, and is said to kill the fish if put into the water in some quantity.

62. **PAULLINIA.** Flowers irregular, with a unilateral disc, polygamo-diœcious. Sepals 5, the upper 2 larger and connate; petals 4, unequal, and a scale; disc annular, with 2 larger and 2 smaller glands; stamens 8, eccentric; ovary eccentric, 3-celled; style 3-fid; capsule 3-gonous or 3-winged above; seeds shortly arillate. Climbing shrubs.

**P. pinnata**, Linn. A climbing shrub, with imparipinnate 5-foliate leaves, the leaflets sessile, obovate-oblong, toothed, the terminal one the larger, 7-15 c.m. long, 3-6 c.m. wide, the others shorter; flowers numerous in narrow racemes 7-10 c.m. long, with a spiral tendril at the base. Capsule 2-3 c.m. long, pear-shaped, 3-valved. Zambesi-land; also West Africa.

63. **SCHMIDELIA.** Flowers polygamo-diœcious. Sepals 4, irregular, imbricated, the inner 2 often larger than the others. Petals 4, ciliated, bearded on the inner face. Disc lobed, eccentric. Stamens and pistil on a more or less distinct torus. Male flower—stamens 8, more or less eccentric and often declinate, the disc occupying the other side of the flower; ovary rudimentary. Fertile flower—stamens 8, surrounding the ovary, and more or less perfect; pistil somewhat eccentric on one side of the disc; ovary 2-celled; cells 1-ovuled, the ovule ascending from the base; style single, with 2 spreading branches stigmatic on their upper surfaces. Fruit of 2 cocci, almost or quite separate, and with the style between them, or by abortion of only 1, with the style at its base. Seeds arillate, embryo curved, cotyledons folded. Leaves simple or 3-foliate, alternate, glabrous or glabrescent, often bearded in the axils of the veins. Shrubs, seldom of timber size, and only worth brief description here.

**S. monophylla**, Presl. A large shrub or small tree with *simple* leaves 7-15 c.m. long, 4-7 c.m. wide, and flowers in lax racemes 5-15 c.m. long. Fruit pubescent till near maturity. Scarce but present throughout the Province; also present in Cape Colony, Natal, Madagascar, Zanzibar, &c. See "Forest Flora of Cape Colony," page 170, Plate XXXII.

**S. africana.** A 3-foliate shrub or small tree; inflorescence copiously paniculate; leaflets petiolate, oval-acuminate, dentate; central leaflet 10-15 c.m. long. Lourenço Marques; also Abyssinia and West Africa. See "Forest Flora of Cape Colony," page 170, Plate XXXIII.

**S. alnifolia**, Baker. Leaves 3-foliate, glabrous; leaflets obovate, blunt, sub-entire. Flowers in lax slender simple racemes. Mozambique.

**S. repanda**, Baker. Leaves 3-foliate, glabrous; leaflets oblong-cuneate, conspicuously inciso-repand. Flowers in lax slender simple or slightly branched racemes. Northern districts.



**S. rubifolia**, Hochst. A small tree with 3-foliate leaves, leaflets obovate-cuneate, irregularly inciso-repand upward, under surface canescent; flowers in simple or slightly branched racemes, nearly sessile. Zamhesi-land.

64. **BLIGHIA**. Flowers polygamo-dioecious, regular, 5 m.m. long, in short axillary racemes; calyx 4-5 lobed; petals 4-5, each with a scale on the inner surface; stamens 7-10, inserted beneath the disc, central; ovary sub-stipitate, 3-angled, 3 celled; style terminal, the stigma 3-toothed. Ovule solitary in each cell, rising from the centre of the axis. Capsule roundish, fleshy, 3-celled; seeds arillate. Large trees.

**B. sapida**, Koenig. *Vern. name*—4-6, Morentima or Shimorentima (also in use for Bersama? mossambicensis). A large tree, though often found as a bush in or around cultivated lands. Leaves pinnate, without terminal leaflet; leaflets in 2-4 pairs, the upper the larger; 10-15 c.m. long, 5 c.m. wide, the lower almost at the base of the rachis and often much smaller, all elliptic-lanceolate or elliptic oblong, acute, and tapering more or less to the very short petiole; glabrous when mature, but at first the growth-buds, stems and leaves are somewhat rusty-pubescent, and tufts of this pubescence sometimes remain in the axils of the veins. Raceme 5 c.m. long, axillary. Flowers not seen and fruit seen only immature, but as seen 1.5 c.m. long, pear shaped, pubescent, 3-4 celled, with 1 erect arillate axile seed near the base of each cell; the capsule leathery, with loculicidal dehiscence, each valve terminated by a style, though the styles are united before dehiscence. Mature capsule described as "roundish in general outline, about 4 in. long, bluntly 3-gonous, fleshy, glabrous, at first yellowish, finally red, with 3 cells, with a single hard black seed in each as large as a cherry, with a prominent white arillus enveloping the lower half or two-thirds. Flowers fragrant and fruit edible and the distilled water of the flowers used as a cosmetic." Abundant in the lower Gaza and M'Chopes districts, present also though less abundant in the Lourenço Marques and Inhambane districts, and also in the tropical forests north of the Zambesi. Sim 5206.

PLATE XXII.

**B. zambesica**, Baker. A tree from near Lake Nyassa, agrees in most characters with the above, but has the calyx cleft only about half-way down, with deltoid divisions not at all imbricate in bud, whereas in *B. sapida* the calyx is deeply cleft, with oblong sepals slightly imbricated in bud.

65. **LECANIODISCUS**. "Flowers regular, polygamo-dioecious. Sepals 5, much imbricated. Petals none. Disc complete, with 10 obscure crenations. Stamens 10, central, the filaments filiform, glabrous. Ovary central, villous, ovoid, 3-celled; stigma thick, reflexed, 3-lobed. Ovules solitary in the cells, ascending, affixed to the axis at the base. Capsule, ovoid, tomentose, pointed, 1-celled, dry, crustaceous, 1-seeded. Seed erect, ovoid, arillus gelatinous. Trees."

**L. fraxinifolia**, Baker. A shrub from the Zambesi and Shire, with abruptly pinnate leaves, having 5-7 sessile, sub-opposite pairs of entire, glabrous leaflets 5-7 c.m. long, 2-3 c.m. wide, "flowers fascicled, in nearly sessile axillary racemes 3-5 c.m. long, . . . capsule broad-oblong, pointed 1.5 c.m. deep, the outer shell hard, nearly black, with a thin grey-downy bloom."

66. **SAPINDUS**. Flowers polygamous or dioecious, regular, in axillary or terminal panicles. Sepals 5, imbricate; petals 5, hypogynous, bearded on the face. Male flower—stamens about 15, with woolly filaments surrounding a hairy rudimentary pistil and girt by a glabrous yellow corona. Female flower—stamens imperfect, pistil raised on a disc, stigmas 3, style central, single, surrounded by the 3 pubescent almost separate ovary lobes. Fruit of 1-2.3 indehiscent berry-like cocci. Leaves alternate, pinnate, exstipulate.

**S. oblongifolius**, Sond. *Vern. name*—10, Ntalala. A shrub or tree, varying from 30 c.m. to 6 metres in height, and from a shrublet to a straggling tree without timber value. Leaves from 20-40 c.m. long, with 10-15 oblong, obtuse, almost sessile leaflets 8-12 c.m. long, 2-4 c.m. wide. Panicle terminal and axillary, 15-30 c.m. long, rufous-pubescent when young. Fruit consists of 3 fleshy cocci, separate almost or quite to the base, and appearing like 3 separate fruits, each 1.5 c.m. diameter, globose, and containing one brown seed coated entirely with a white soapy material which produces a lather with water. Abundant near the coast in the extra-tropical districts, as also in Natal and Cape Colony. See "Forest Flora of Cape Colony," page 173 and Plate XXXV.

**S. xanthocarpus**, Klotzsch in Peters' Mossamb. Bot., 119. *Vern. names*—4, Tezansema; 6, Kangelanqua. Appears to me to differ from *S. oblongifolius* only in being smaller in all its parts except the panicle. It is from the Zambesi and Shire.

67. **PAPPEA**. Monoecious or polygamo-dioecious. Flowers small, regular, trimorphous; the male paniculate, the female racemose. Calyx saucer-shaped, with 5 short sub-equal lobes; petals 5, spatulate, obovate, clawed, woolly on the inner surface. Male flower—stamens 8-10, all perfect, on exerted filaments, surrounding a flat



disc, with or without a minute abortive ovary. Fertile flower—stamens 8-10, either short and abortive or longer and more or less perfect; the filaments being more woolly the less perfect the anthers are. Ovary compressed, reniform, 2-celled (occasionally 3-celled), pubescent, with a cylindrical undivided style. Fruit didymous, of 2 partly connate carpels, or more usually by abortion consisting of 1 fertile carpel only. Carpels globose, pubescent, foveolate, with a distinctly marked line by which it tardily dehisces. Ovule solitary in each carpel, at first sitting in a green saucer-shaped aril which afterwards develops semi-transparent, fleshy, irregular lobes, these imbricate and completely enclose the seed when half-mature and become red at maturity. Leaves alternate, simple, exstipulate.

**P. capensis**, Eckl. *Vern. names*—4, Jetroqua; 13, Ilitye. A shrub or small tree, found in the Lourenzo Marques and M'Chopes districts and in Natal and Cape Colony. It has leaves simple, 3-8 c.m. long, 1-2 c.m. wide; obovate, rounded at both ends, glabrous, lighter on the under side, almost entire, and shortly petioled; those from coppice shoots larger and more distinctly serrate. Male flowers in many-flowered panicles 10 c.m. long; fertile flowers in 5-20 flowered racemes; sometimes dioecious, sometimes monœcious on separate branches, and occasionally more or less mixed, all the fertile flowers on 1 tree being of 1 form, but the stamens varying much on different trees. See "Forest Flora of Cape Colony," page 171 and Plate XXXIII. fig. 3.

68. **DIACARPA**. (New genus.)<sup>1</sup> Floral characters unknown. Inflorescence a terminal panicle; fruit of 2 1-seeded samaras; seeds pendulous from the placenta connecting the 2 samaras; leaves abruptly pinnate; leaflets alternate or sub-opposite. In the absence of flowers its place cannot be definitely decided, but its relation seems to be with *Pterocarpus*.

**D. alata**. (New species.)<sup>2</sup> *Vern. name*—15, Hlanhlätz. Panicle 8-15 c.m. long, terminal. Leaves 15 c.m. long, the slender rachis terminating in a short point; leaflets alternate or sub-opposite, obliquely oblong-falcate, 5-7 c.m. long, 1-2 c.m. wide, rounded at the apex; the midrib near the lower margin which is entire or with 1 or 2 teeth, the upper portion much wider than the lower and toothed along its margin. Samaras 2, each 3-4 c.m. long, 1.5 c.m. wide, the wing gradually wider, the hard brown slightly compressed seed pendulous in each from the placenta connecting the 2 samaras. Axillary buds covered with velvety-brown pubescens. Only 1 tree seen, in the kloof between Mr. Stem's house and his river dam, below Estatuene, Maputa district—a spreading tree 10 metres high, 30 c.m. diameter, with a nearly white warty bark and numerous twigs; but the fact that several natives separately gave it the same name indicates that other specimens occur in the district. Sim 6307.

PLATE V. C.

69. **DODONÆA**. Flowers unisexual, polygamous, in short axillary or terminal panicles. Sepals 4-5, more or less connate. Petals absent. Male flower—stamens 8-10, hypogynous, oblong, longer than their filaments, without disc or ovary, or surrounding a rudimentary ovary. Fertile flower—stamens reduced in size, imperfect; ovary on an almost obsolete disc, shortly stalked, glandular dotted, 3-angled, 3-celled, cells 2-ovuled; style single, cylindrical, 3-fid. Capsule membranous, usually 3-celled, the cells each with a membranous reticulated dorsal wing. Resinous shrubs or trees, with alternate, simple, exstipulate leaves.

**D. viscosa**, Linn. *Vern. name*—6, Seka-seka. A shrub 2-5 metres high, with obovate entire leaves 8-10 c.m. long, cuneate at the base, viscid when young. Flowers in lax viscid racemes; fruits 2-3 winged, 1-1.5 c.m. long. Never of timber size but used for hut-wattles, &c. Frequent throughout the Province, especially on light sandy soils.

Another shrub or small tree (6, Injangoti; 10, Nasipolela and i-pungwa) having elliptic-oblong, pointed petiolate, entire leaves 3 c.m. long and not viscid; few-flowered racemes, and 2-3 winged white fruits 1 c.m. long and wide, appears to belong to *Dodonæa* but was not seen in flower. It is abundant through the whole Province. Another shrub (6, Kangeluru) having similar leaves but constantly 2-winged crimson fruits is probably another species, and is common in the sandy districts.

<sup>1</sup> **DIACARPA**. (Gen. nov.) Inflorescentia apicali paniculata; floribus haud visis; fructu samaris duobus monospermis; semine pendulo e placenta axillari; foliis paripinnatis, foliolis alternis vel sub-oppositis. *Pterocarpus* affinis videtur.

<sup>2</sup> **D. alata**. (Sp. nov.) Arbor patula 10 m. alta, cauli 30 c.m. diam.; cortice pæne alba, verrucosa; ramis crebris. Foliis 15 c.m. longis; petiolo gracili in unum brevem producto; foliolis oblique oblongo-falcatis, 5-7 c.m. longis, 1-2 c.m. latis, apice rotundatis, inaequilateris, lateris inferioris angustis margine integra, lateris superioris multo latioris margine dentata. Panicula apicali, 8-15 c.m. longa. Samara 3-4 c.m. longa, 1.5 c.m. lata, ala sursum patescente. Semine duro, fusco, subcompresso. Genimis axillaribus pubescentia fusca velutina vestitis. Tab. V. C.

70. **BERSAMA**. Racemes axillary or terminal on short side branches. Flowers apparently hermaphrodite. Sepals 5, nearly equal, the lower pair connate, imbricate. Petals 5, unequal, irregular in form. Disc raised, unilateral; stamens 4-5, central, inserted within the disc, more or less connate. Ovary 4-5 celled, ovule solitary (?) erect. Capsule ligneous, globose, 3-5 celled, tubercled externally, dehiscence loculicidal; seeds arillate, albuminous. Trees or shrubs with alternate, imparipinnate leaves, mostly deciduous.

Several of the deciduous, pinnate leaved trees seen without leaf, flower or fruit, probably belong to this African genus. The following evergreen tree is included in it with great hesitation:—

**Bersama (?) mossambicensis**. (New species.)<sup>1</sup> Vern. names—5, Tsukuhlumumbu; 6, Maritshima; 4 and 6, Morentima or Shimorentima (these names shared with *Blighia*). Leaves pinnate, exstipulate, the pinnules sub-opposite or alternate, elliptical or oblong-elliptical, pointed, usually oblique and tapering shortly at the base. Inflorescence axillary to the upper leaves, about 3-flowered on a 1-2 c.m. peduncle; flowers almost sessile, 3 m.m. long, bracted; calyx with 5 triangular teeth; petals 5, imbricate; stamens 10-12, outside a flat ring-disc, the filaments free and apparently equal (though no fully mature flowers were available for examination); anthers hairy; ovary pubescent, 4-5 celled, with almost sessile stigma. Fruit woody, tubercled outside, dehiscent, 4-5 celled, each cell containing 2 black seeds pendulous from a red aril rising from the base. I hesitate to make a new genus of this tree, but it does not appear to me to fit any described genus well. It has much resemblance to *Trichilia*, from which the free stamens and 4-5 celled ovary distinguish it; from normal *Bersama* the 2-ovuled cells and the more numerous stamens differ. Frequent throughout the Province, often as a shrub but sometimes as a very large tree. Sim 5204.

PLATE XXIII.

#### SERIES II.—CALYCIFLORÆ.

Ovules formed in closed ovaries. Calyx and corolla usually both present. Calyx-tube either free from, or adnate to, the ovary. Petals free; petals and stamens springing from the calyx-tube, either perigynous or epigynous.

#### CALYCIFLORÆ. GROUP I.

Flowers having a more or less discoid receptacle adnate to the calyx-tube, the petals and stamens rising from its edge or from inside it. (See *Commiphora*, included in *Thalamifloræ*.)

#### CALYCIFLORÆ. GROUP I. SECTION 1.

Flowers usually hermaphrodite; ovary 2 or more-celled; ovules 1-2 in each cell; leaves simple (except *Vitis*). Stamens isomerous.

#### FAMILY XXIII.—AMPELIDEÆ.

Shrubs or climbers, often tendril-bearing. Flowers regular, apparently perfect. Calyx cup-shaped, entire or lobed. Petals 4-5, free except their points, which usually cohere, deciduous by each petal dehiscing at its base, the cap-like united points falling off together. Stamens opposite the petals, 4-5, free, hypogynous, inserted outside the disc which surrounds the ovary. Ovary ovoid, pointed, 2-celled; style short or absent; cells 2-ovuled. Berry fleshy, globose, 1-2 seeded, edible or astringent.

71. **VITIS**. Shrubs or climbers; leaves simple or digitately compound, branches herbaceous or ligneous, tendrils usually present. About 80 tropical African species are described, neither of which have any forestal value, and many are forest weeds of the nature of *monkey-ropes*. A 3-foliate shrubby species (4, Ingwanhela; 6, Ruta) common in extra-tropical districts is used for making sieves from the bark; and the succulent stems of *V. quadrangularis* (4, Clemafin) when heated are applied to cuts, &c.

<sup>1</sup> *Bersama (?) mossambicensis*. (Sp. nov.) Plerumque frutex, sed aliquando arbor grandis. Foliis exstipulatis, pinnatis; foliolis sub-oppositis vel alternis, ellipticis vel oblongo-ellipticis, acutis, plerumque obliquis et basi abrupte contractis. Inflorescentiis in axillis foliorum superiorum, circiter trifloris, pedunculo 1-2 c.m.; floribus fere sessilibus, bracteatis, 3 m.m. longis; calycis dentibus 5 triangularibus; petalis 5 imbricatis; staminibus 10-12, filamentis liberis et (vix maturis) acquilongis; antheris hirsutis; disco annulari plano inter stamina et ovarium; ovario pubescente, 4-5 loculari; stigmatibus sub-sessilibus. Fructu ligneo, extus tuberculato, dehiscente; loculis 4-5, omnibus 2-spermis; semine atro pendulo ex arillo rubro. *Trichilia* similis est, sed differt staminibus liberis et ovario 4-5 loculari. A *Bersama* vera differt loculis 2-spermis et staminibus pluribus. Tab. XXIII.

## FAMILY XXIV.—RHAMNEÆ.

Flowers small, regular, hermaphrodite. Inflorescence various, often cymose. Calyx 5-lobed, its tube filled or lined by the disc, the segments valvate in bud. Petals 5, small, hooded, perigynous, frequently absent. Stamens 5, opposite the petals. Ovary sessile, superior or more or less inferior 2-3-4 celled; cells 1-ovuled, ovules erect. Styles short, connate below. Fruit fleshy or capsular; seeds usually albuminous. Leaves simple, alternate; stipules minute or absent, or spinose. Trees, shrubs and climbers; few are of much importance.

72. **ZIZYPHUS**. Flowers in axillary cymes, small, greenish, with a prominent flat 5-sided disc. Calyx-segments triangular, keeled within. Petals ovate, clawed, yellowish, hooded. Stamens opposite to and longer than the petals. Ovary 2-celled, somewhat sunk into the disc and connate with it. Styles recurved. Drupe fleshy, 1-2 seeded. A small genus, widely dispersed

**Z. mucronata**, Willd. *Vern. names*—1, Buffalo Thorn; 4, Pasa-mali; 6, im-pasa-mali; 10, Numatunga; 4, 12, 13, Um-pafa; 15, Mhlalu-bantu. A tree 5-10 metres high, 30-45 c.m. diameter, frequent throughout the Province, as also in Cape Colony, Natal, Transvaal, Abyssinia and West Africa. Branches usually armed with stipular spines, 1 hooked downward and 1 straight upward. Leaves oblique at the base, ovate or ovate cordate, crenate-serrate, 3 veined, usually obtuse, 4-5 c.m. long, 3 c.m. wide, glabrous or almost so, petiolate. Cymes axillary 1-3 c.m. long, many-flowered; fruits numerous, globose, 1 c.m. diameter, fleshy, dark red, not edible, and having the scar of the fallen calyx-segments evident as a small disc around the base. Usually a spreading tree in open scrub, and in Magenja da Costa it seems to have a partiality for ant heaps. See "Forest Flora of Cape Colony," 177, Plate XXXVI. fig. 1.

PLATE XXIV. B. 1, Fruiting cyme; 2, Flower,  $\times 3$ ; 3, Petal and stamen,  $\times 6$ .

**Z. jujuba**, Lam. *Vern. names*—1, Jujube; 2, Masonje; 10, Masawa; and var. *nemoralis* is included with *Z. mucronata* under the name, 10, Numatunga. A very variable small tree, with the branches usually armed with stipular spines, 1 hooked downward and 1 straight upward. Leaves more or less oblique at the base, ovate, finely serrulate, 3-nerved, glabrous above, white tomentose below, as also is the young wood and inflorescence. Cymes short, many-flowered. Fruit 2-3 c.m. long, 1.5 c.m. diameter, oblong, with a large disc. Common in semi-cultivation or naturalised in the tropical districts, with rounded almost entire leaves and edible fruits.

PLATE XXIV. A. 1.

Var. *nemoralis*, the usual forest form, has sharper, more oblique, and more serrated leaves, and fruits which are not edible. Frequent in the tropical forests, often as a low trailing bush very different in appearance, but without specific distinction. Not seen south of Inhambane.

Two other specimens from Zambesia are mentioned in "Flora of Tropical Africa," from insufficient material; of these I know nothing further.

73. **BERCHEMIA**. Calyx tube short, 5-lobed; petals 5, hooded; stamens 5; disc clothing the calyx tube, margin free. Ovary immersed in the disc, free, ovoid, 2-celled, attenuated into a 2-fid style. Drupe oblong, 2-celled. Leaves simple, deciduous.

**B. discolor**, Helmsl. (= *Scutia discolor*, Klotzsch in Peters' Mossamb. Bot. 110, t. 21.) A small tree with alternate or sub-opposite ovate or lanceolate, almost entire leaves 3-6 c.m. long, glaucous on the under surface. Cymes axillary, few-flowered. Drupe large, yellow, fleshy, 2 c.m. long, 2-seeded, edible. Zambesia.

74. **SCUTIA**. Flowers small, greenish, in few-flowered, shortly peduncled, axillary umbels or fascicles. Calyx cup-shaped, its tube longer than its triangular margined segments. Petals flat, and with the stamens perigynous. Disc surrounding but not connate to the globose 2-celled ovary. Style short, stigmas 2-3. Fruit leathery or fleshy, globose, sitting on or in the somewhat flattened cup of the calyx-tube, and containing 2 separable stones with flat adjacent faces. Trees or ramblers. Leaves simple, alternate or approaching in pairs; stipules minute, caducous; a sharp intra-axillary hooked prickle (reduced branch) often present.

**S. indica**, Brogn. *Vern. name*—13, isi-pinga. Sometimes a bush or small tree; sometimes a widely rambling "Monkey-rope." Leaves oblong or elliptical, very variable. Fruits black, 6-10 m.m. diameter, very astringent, but eaten by children. A useless weed, common in Lourenzo Marques and present in M'Chopes and Inhambane. See "Forest Flora of Cape Colony," 178, Plate XXXVI. fig. 2.

75. **RHAMNUS**. Flowers small, green axillary, 1 or more in an axil. Calyx urceolate with 5 segments; disc lining the thin tube; petals 5 or absent, when present very small, cuculate and emarginate. Stamens 5, minute, opposite the petals, and often included in the hood. Ovary free, ovoid, 3-celled; styles 3, short, connate below. Fruit fleshy, girt at the base by the calyx-tube and containing 2-3 bony stones. Seeds albuminous. Leaves simple, petiolate, stipulate. R. prinoides, frequent in the Cape Colony and Natal, and in Abyssinia, was not noticed during my journey.



- R. Zeyheri**, Sond. *Vern. names*—1, Red Ivory; 2, Pau-rosa(?); 4, Nukarane; 13, Um-nini; 15, Mnai. A small or medium-sized unarmed glabrous tree with numerous twiggy branches, mostly in opposite pairs. Leaves opposite 2-4 c.m. long, 1-2 c.m. wide, shortly petiolate, elliptical, obtuse, entire, pale below, and usually with undulate or reflexed margin. Veins pinnate, numerous, often red, with fine secondary venation. Stipules short, acute. Pedicels axillary, 1-flowered, 1 c.m. long; flowers small, greenish; fruits 1-1.5 c.m. long, 3 m.m. diameter, nearly cylindrical, tipped by the style, and seated on the flat disc. Frequent in the Lebombo Range, less common in other extra-tropical localities; occurs also in Natal and Transvaal. This is probably the source of the beautiful 'Pau-rosa' timber of Magde and neighbouring districts.

PLATE XXV.

76. **COLUMBRINA**. Calyx lobes 5; petals 5, hooded, clawed; stamens 5, enclosed in the petal-hoods. Disc fleshy, filling the calyx-tube. Ovary immersed in the disc, 3-celled; style 3-lobed. Drupe dry, separating septicidally into 3 cocci, and girt  $\frac{1}{3}$  its length by the calyx-tube. Leaves alternate, 3-nerved below, stipulate.
- C. asiatica**, Brongn. A glabrous shrub or small tree with ovate or cordate, crenate-serrate, petiolate leaves 5-8 c.m. long; flowers in short axillary cymes; fruit 1 c.m. diameter. Scattered throughout the Province.

## FAMILY XXV.—CELASTRINEÆ.

Flowers small, regular, white or greenish, usually hermaphrodite. Inflorescence mostly axillary and cymose, occasionally paniculate. Calyx 4-5 lobed, with imbricate aestivation, its tube saucer-shaped, filled with the flat cushion-like 4-5 lobed disc, from under the margin of which the petals and stamens arise. Petals 4-5, imbricate in aestivation. Stamens 4-5, alternate with the petals or 3. Ovary superior, free or almost so, 2-5 celled; ovules 2 or 1 in each cell, anatropous, usually erect. Fruit various, often 3-celled sometimes samaroid, dehiscent or indehiscent. Seeds often arillate, sometimes winged, albuminous or exalbuminous. Leaves opposite or alternate, simple. Stipules caducous if present.

77. **GYMNOSPORA** (= *Celastrus* Linn.). Trees or shrubs, often spinous, with alternate simple leaves, axillary, clustered, cymose or panicled, small 5-merous white or yellowish flowers, usually 3-celled ovary somewhat sunk into and confluent with the disc; cells 2-ovuled, 1-seeded; capsules 1-3 celled, coriaceous or dry, dehiscent or bursting more or less, and 1-3 seeded without a stone. Seeds albuminous, often arillate. Leaves alternate, exstipulate.

A considerable genus of trees and shrubs; of those found in this Province all are small shrubs of no forestal importance and several are undescribed. Among *vern. names* noted as belonging to this group are—4, She-hlwangwa, impropane and mantome; 6, Intsaru or Tsaru; 8, Cheringa; 10, Na-peach and Sangiera (small tree); 15, Hlangwe.

78. **PTEROCELASTRUS**. Glabrous trees without spines, having alternate entire coriaceous leaves, axillary-cymoid inflorescence, 5-merous small white flowers, 3-celled half-inferior ovary; ovules erect, 2 in each cell; stamens between the lobes of the disc; very short style, 3-lobed stigma, and 3-celled woody ultimately dehiscent capsules containing 1-3 albuminous seeds, each enclosed in a thin aril. Capsules with 3 or more irregular wings.

- P. variabilis**, Sond. *Vern. name*—13, i-twyina. A spreading tree, usually not tall, having lanceolate to obovate, shortly petiolate, entire leaves, 5-6 c.m. long, 1.5-4 c.m. wide, axillary cymes, and abundant yellow 3-winged fruits by which it is easily identified. Seen sparingly and only in the Lebombo Range in Maputa district; it occurs plentifully in Cape Colony and Natal and is used for timber purposes and for the extraction of tannin from its leaves. See "Forest Flora of Cape Colony," page 187 and Plate XLII.

79. **ELÆODENDRON**. Unarmed trees or shrubs with opposite or alternate simple leaves, cymoid paniculate or umbellate axillary inflorescence, and greenish, 4-5 merous, hermaphrodite or polygamous flowers. Ovary partly immersed in the thick 4-5 lobed flat disc 2-3 celled; cells with 2 erect ovules each. Style very short. Fruit indehiscent, with a dry or fleshy epicarp and a more or less ligneous endocarp, often a decided stone, with 1-3 usually 1-seeded cells. Seeds albuminous, exarillate. Stipules when present minute, caducous.

- E. Æthiopicum**, Oliv. *Vern. name*—4, Jetroqua (which it shares with *Pappea*). A small tree, abundant on the sandy shores and sand dunes in the southern parts of the Province, as also in Natal, Cape Colony and West Africa. Leaves alternate, 3-4 c.m. long, 1-2 c.m. wide, coriaceous, oblong or elliptic-oblong, obtuse, shortly petioled, crenate-denticulate, usually glabrous above and more or less pubescent below, but sometimes all young parts densely pubescent. Flowers in dense shortly pedunculate axillary umbels, very small, greenish. Fruit ovoid, shortly-pointed, 1 c.m. long, somewhat fleshy, 1-seeded. See "Forest Flora of Cape Colony," 191, Plate XLIV.



**E. sphaerophyllum**, Presl. *Vern. name*—4-15, Inkonguluti. A small tree, closely allied to *E. æthiopicum*, from which it differs in having wider, more coriaceous, crenate serrulate leaves glabrous on both sides, and larger, globose, red, more or less edible fruit. Lebombo Range, not common, and not of economic importance as usually small.

Another species with axillary 5-10 flowered corymbs, 5-merous large flowers 2 c.m. across, oblong fruits 3-4 c.m. long, and obovate, firmly coriaceous, shortly pedunculate, glabrous leaves 6-7 c.m. long, 4-5 c.m. wide was found as a small tree among the coast scrub at Bartholemew Dias, and is apparently an unnamed species.

80. **HIPPOCRATEA**. Flowers small, hermaphrodite, in axillary cymes. Sepals 5; petals 5; stamens 3; anthers extrorse; ovary surrounded by or raised upon a disc, 3-celled; ovules 2 or more in each cell 2-seriate. Fruit carpels 3, distinct, flat, dehiscing along the median line. Seed compressed, on top of a wing. Trees or climbing shrubs with opposite leaves.

**H. indica**, Willd. A glabrous climber with elliptical, finely serrulate or nearly entire, petiolate leaves 5-8 c.m. long, 2-5 c.m. wide. Flowers very numerous, small. Ovules 2 in each cell. Carpels oblong 3-4 c.m. long, 1-5 c.m. wide. Rovuma River, West Africa, India, &c.

**H. Kirkii**, Oliv. Young parts pubescent. Leaves elliptical, obscurely serrulate, 2-3 c.m. long, 1-2 c.m. wide. Cymes short, pubescent. Ovules 2 in each cell; carpels obovate oblong. Zambesi.

**H. longipetiolata**, Oliv. Glabrous. Leaves widely lanceolate, serrulate, 3-7 c.m. long, 1-3 c.m. wide, with petiole 1-2 c.m. long. Carpels obovate, 5-6 c.m. long, 2-3 c.m. wide, with several ovules in each cell. Zambesi.

**H. delagoensis**. (New species.)<sup>1</sup> *Vern. name*—4, Umboti. A glabrous sub-scandent shrub having branches opposite, divaricate, leaves opposite, 2-3 c.m. long, very variable from obovate to lanceolate, with several teeth, and there are also among them specimens with entire elliptical leaves 4-5 c.m. long. Carpels 3, divaricate, flat, obovate, coriaceous, splitting down the middle, and with 4 seeds in each. Seeds brown, 1 c.m. long on top of a winged petiole 2-5 c.m. long, 1 c.m. wide. Common in the neighbourhood of Delagoa Bay, present also at M'Chopes and Inhambane. Sim 6390.

PLATE XXX. B.

81. **SALACIA**. Flowers hermaphrodite. Sepals 5; petals 5; stamens 3; ovary 3-celled; ovules 2 or more in each cell. Fruit baccate, undivided, 1-3 celled, 1 or several seeded. Trees or shrubs with glabrous opposite or sub-opposite, nearly entire leaves, and small flowers in axillary fascicles.

**S. pyriformis**. A glabrous shrub or small tree with oblong-elliptical, entire, coriaceous, shortly petiolate leaves 8-20 c.m. long, 4-12 c.m. wide. Fascicles sessile; fruit pear-shaped, obtusely 3-sided. Zambesi.

#### CALYCIFLORÆ. GROUP I. SECTION 2.

Flowers usually unisexual or polygamous, ovary 1-celled, ovules solitary, pendulous.

#### FAMILY XXVI.—ANACARDIACEÆ.

Trees or shrubs, with alternate exstipulate simple or compound leaves, axillary or terminal paniculate or racemose inflorescence; hermaphrodite, polygamous or diceious small flowers having a cushioned annular disc, under the edge of which the stamens are inserted. Calyx-segments and petals 4-6; stamens as many or twice as many or more (1 only in *Mangifera*). Ovary free, 1-celled or 2-5 celled, cells with 1 pendulous ovule each, styles 1-3, short; drupe dry or fleshy, indehiscent, and sometimes having a large woody stone. Seeds exalbuminous. Juice usually acrid, sometimes poisonous. The bark of various *Rhus* species is used in tanning, and varnishes are obtained from this and other genera. The Mango and Kaffir Plum are edible fruits, the Cashew-nut and Pistacio-nut are products; *Rhus cotinus* yields a dye-wood, and several kinds yield useful timbers.

82. **RHUS**. Shrubs or trees, having alternate simple or 3-foliate leaves (in local species), and axillary or terminal panicles of numerous small or minute, greenish, usually polygamous flowers. Calyx-segments and petals usually 5; stamens usually 5, inserted round the disc, those of the male flower abortive. Ovary sessile, 1-celled,

*Hippocratea delagoensis*. (Sp. nov.) *Frutex glabra, subscandens; ramis oppositis divaricatis; foliis oppositis, plerumque 2-3 c.m. longis, forma maxime varia, obovatis vel lanceolatis, margine dentata vel ellipticis, 4-5 c.m. longis, margine integra. Carpellis 3, divaricatis, compressis, obovatis, coriaceis, quoque fissura media rumpente, 4-spermo. Semine fusco, 1 c.m. longo. Frequens prope Delagoa Bay, M'Chopes, et Inhambane. Tab. XXX. B.*

with solitary ovule pendulous from a basal funicle. Styles 3, free or connate below; ovary of male flower abortive or absent. Drupe usually dry, with a coriaceous or ligneous putamen, 1-seeded, exalbuminous. Many species, of which nearly half are South African, and of these a good few extend into the southern forests of this Province. These are 3-foliate useless shrubs or shrublets, for which see "Flora Capensis," I. 506, and "Forest Flora of Cape Colony," page 192. Among the *vern. names* for these I noted the following, viz.:—4, Hlaba-kunkune; 6, Gandasendua; 10, Anamaka and Siwawe; 15, Hlongoshan, Umhlanyoni and Pembet. Of the 1-foliate species which constitute the sub-genus *Anaphrenium*, the following occur:—

**R. longifolia**, Sond. A large tree found throughout the Province, as also in Cape Colony and Natal. Leaves alternate, oblong or elliptical, tapering to each end, undulate, 10-15 c.m. long, 3-4 c.m. wide, petioled, glabrous, green above, pale below. Panicles terminal on main and side branches, large or small, eanescent. Drupe oblique, 1-1.5 c.m. long, almost black. This and the 2 following species are not separated in native opinion, and the following names are used for the 3, viz.:—4, isi-mungu-mafe; 5, 6, Sassa, Satsa or Intsatsa; 10, Na-kadi, Mkakambi, or Mikatanguo; 12, isi-fuee or isi-fika; 13, Umkomiso; 15, Siete.

**R. insignis**, Delile. A smaller tree than the last, often only 3-5 metres high; leaves 9-10 c.m. long, 2 c.m. wide, glabrous above, silvery below, usually ternate. Panicles pubescent. Abundant Maputa to M'Chopes, present but less frequent on the Zambesi and northward. Too near *R. mueronifolia*, Sond.

**R. Salicina**, Sond. Small tree 3-5 metres high; leaves oblong, mucronate, hairy on the upper surface, pubescent and somewhat silvery below, alternate, sub-opposite and ternate. On the top of the Lebombos near Estatuene.

In the forests of Magenja da Costa coppice shoots were found where the roads had been cut, which had elliptical leaves 12-15 c.m. long, 4-6 c.m. wide, green and softly pubescent on both surfaces, which surroundings indicated to be coppices of *Rhus longifolia*. If so, the 3 species here mentioned should be regarded as forms rather than species.

83. **SORINDEIA**. Flowers small, polygamous or dioecious, in terminal or axillary panicles. Leaves pinnate. "Petals valvate or sub-valvate. Ovule suspended near middle of cell." As the only species found in the Province is included in the genus with doubt by Prof. Oliver in "Flora of Tropical Africa," and differs generically from the other species, further characters are here omitted and given only for that species, of which my material is insufficient to constitute the new genus which will be required when complete material is obtainable.

**S. (?) trimera**, Oliv. *Vern. name*—10, Msamba. A very large glabrous tree, growing near streams in Magenja da Costa and Nhamaeurra. Leaves alternate, 22-30 c.m. long, imparipinnate; leaflets about 4 opposite pairs and terminal one; 5-10 c.m. long, 5 c.m. wide, elliptical, bluntly pointed, entire, firm, glabrous, with stout petiole 5-10 m.m. long and pronounced midrib. Panicle terminal 8-20 c.m. long, many-flowered, seen by me in fruit only. Fruit 3 c.m. long, 2 c.m. diameter, ovate, green, seated in the persistent 3-lobed calyx, within which and under the fruit 3 oblong petals and 6 filaments often remain under a membranous disc-ring. The filaments do not show whether all are stamens or 3 staminodia. Fruit with hard bony putamen, 3-celled, usually only 1 cell fertile, 1-seeded, the seed nearly flat, pendulous from near the top of the axile placenta, exalbuminous. Juice of the fruit resinous, exceedingly viscid, and smells strongly of turpentine. Juice of stem watery or somewhat milky, flowing freely and drying to a gum used for caulking boats. Formerly recorded only from West Africa. This will probably prove a valuable timber tree, and is often 100 to 150 c.m. diameter. The 3-celled fruit, 3-merous flowers and opposite leaflets all indicate that this tree is out of place in this genus.

PLATE XIX. 1, Leaf and fruiting panicle, 1 fruit removed showing 3 sepals, 3 petals and 6 filaments; 2, Transverse section of fruit; 3, Vertical section of fruit; 4, Seed.

84. **MANGIFERA**. Flowers polygamous or dioecious. Calyx 5-lobed; petals 5, imbricate in aestivation; stamens by abortion usually 1; ovary free, sessile, 1-celled; drupe 1-seeded, more or less edible, with a fibrous fleshy mesocarp and a large bony putamen. Leaves simple, entire, alternate.

**M. indica**, Linn. *Vern. names*—1, Mango; 2, Manguiera. A large glabrous tree, having many more or less permanent varieties differing among themselves in foliage and fruit; leaves oblong-lanceolate or wider, 12-24 c.m. long, 3-6 c.m. wide, acute, petioled. Panicle terminal, many-flowered, 10-30 c.m. long. Fruit obliquely oblong, ovoid, or curved 8-16 c.m. long, 4-8 c.m. wide, somewhat compressed, and variable in regard to colour, flavour, and amount of fibre, but including varieties which are first-rate dessert fruits. Male flower—calyx-segments 5; petals 5; stamen 1 among incurved glands. Female flower—no stamens; ovary 5-lobed, with central subulate style. Probably originally introduced from Asia, but now widely dispersed throughout the tropical forests, and usually the largest trees in these forests, often up to 1½ metres diameter, and used to make the largest dug-out boats (Mandea).

PLATE XXVII. 1, Panicle; 2, Tree, general aspect (reduced); 3, Staminate flower, × 10; 4, Pistillate flower, × 10; 5, Calyx and Corolla, × 5; 6, Fruit.

85. **ANACARDIUM.** Flowers polygamous in large terminal panicles. Calyx-segments 5; petals 5; stamens about 10, not all equal; ovary a free, sessile, 1-seeded nut, with an oblique style, changing to reniform as it advances. Fruit reniform, attached by one end to the much-enlarged, succulent, edible, oblong pedicel.

**A. occidentale**, Linn. *Vern. names*—1, Cashew; 2, Caju or Cajueiros; 4 to 11, Canjew. A spreading evergreen tree, originally introduced long ago from America; widely distributed and protected by the natives; and now the most frequent tree in the Province in or near where cultivation is, or has been, practised. Many large areas of abandoned lands are almost pure open forests of this tree, and the natives never cut it down as it supplies both food and drink. Flowers polygamous; either pistillate only, with a somewhat reniform ovary and lateral style from the sinus; staminate only with about 10 stamens, of which one is long; or having both pistil and stamens, of which the former is conical subulate and abortive, and the latter all short except one. The so-called "fruit" is a swollen pedicel, 4-6 c.m. long, 4 c.m. diameter, forming the well-known succulent and edible article; the true fruit is the upper reniform portion usually known as the Cashew-nut, eaten roasted, and distilled into a strong spirit. Leaves obovate, rounded at the apex, narrowed below, petiolate, glabrous 10-15 c.m. long, 5-7 c.m. wide, prominently veined below. Timber useful.

PLATE XXVIII. 1, Tree, general aspect (reduced); 2, Panicle and leaves; 3, Flower (slightly enlarged); 4, Flower, with abortive pistil, 1 long and several short stamens (petals removed),  $\times 3$ ; 5, Flower with stamens only (petals removed),  $\times 3$ ; 6, Flower with fertile pistil only (petals removed),  $\times 3$ ; 7, Fruit and so-called "fruit."

86. **SCLEROCARYA.** Flowers dioecious or polygamous. Sepals 4-5; petals 4-5. Male flower—stamens 14-18, inserted round a small fleshy disc, pistil rudimentary. Female flower—stamens impotent, ovary 2-3 pointed, 2-3 celled, with 1 ovule in each cell. Drupe with a 2-3 celled stone, 1 seed in each cell. Seeds exalbuminous. Leaves imparipinnate, alternate, glabrous.

**S. caffra**, Sond. *Vern. names*—2, Ocanheiras; 4, Okania and Helinga-maash; 5, 6, 7, 8, Tsula; 10, Mtula or Motula; 13, Um-gamo; 16, Morula. A rounded, much-branched, low, deciduous, dioecious tree, usually found in open grass or thorn country rather than in dense forest. Leaves 12-30 c.m. long, 10-12 c.m. wide, simply pinnate; leaflets about 4 pairs and a terminal one, all ovate, acute, oblique at the base, 3-5 c.m. long, 2-3 c.m. wide, with a 2 c.m. slender petiole. Male inflorescence in many-flowered racemes 6-9 c.m. long, clustered under the new leaves, mostly with 4 petals, 14-18 stamens and rudimentary pistil; female flowers 1-3 on peduncles 2-3 c.m. long, also clustered below the new leaves, and with 5 petals, impotent stamens, and ovary 2-3 pointed, 3-celled, with 1 ovule in each cell. Fruit elliptical, 3-4 c.m. long, containing one 3-pointed 2-3 celled bony nut, with 1 seed in each cell, the seed growing through an opening at the top of the cell, and the empty nut afterwards showing 2-3 holes at its apex like a palm seed. The thick oily cotyledons are edible and the fruit is used for the production of an intoxicating liquor. The bark is used for water-buckets, for drums for peanuts, &c., and for boats.

PLATE XXIX. 1, Leaf; 2, Male inflorescence; 3, Pistillate inflorescence; 4, Do. after fertilization; 5, Pistillate flower;  $\times 5$ ; 6, Male flower,  $\times 5$ ; 7, Section of ovary,  $\times 5$ ; 8, Fruit; 9, Seed; 10, Tree, general aspect (much reduced).

87. **HITZERIA.** Unknown to me; described by Prof. Oliver as follows:—"Flowers monœcious. Calyx 4 (5)-lobed; segments oval, valvate and exceeding the petals in bud. Petals 4 (5), inserted on the calyx, slightly imbricate. Stamens (of male flowers) 8, alternately shorter, inserted on the calyx; anthers oval-oblong; mucronate, versatile; ovary 0. Female flower 5-merous. Stamens 10, rudimentary; ovary 3-celled; style short; stigma peltate, 3-lobulate. Drupe tomentose, 1-celled, 1-seeded. Seed ascending with a minute inferior radicle and thick, fleshy, plano-convex cotyledons. Tree. Leaves clustered at the extremities, unequally pinnate, 5-7 foliate, scabrid-pubescent. Flowers small, in spicate racemes, buds oblong. Drupes edible. Monotypic.

"**H. edulis**, Klotzsch in Peters' Mossamb. Bot. 89. Leaflets oval or ovate oblong, acute or obtuse, rounded at the base, the lateral opposite, sub-sessile, shortly hispid or scabrid-pubescent at least when young, not exceeding  $2\frac{1}{2}$  in. in our specimens. Mozambique, Dr. Peters, (?) Tette, Zambesia, Kirk, but leafless and fragmentary."

### CALYCIFLORÆ. GROUP II.

Sepals connate at the base. Calyx-tube without distinguishable disc, but bearing the petals and stamens near its edge or on the base of its lobes.

#### CALYCIFLORÆ. GROUP II. SECTION 1.

Ovary superior, carpels 1 or more, free or partly connate. Stamens alternate with the petals when isomalous, usually more numerous,



## FAMILY XXVII.—CONNARIACEÆ.

Flowers hermaphrodite, regular. Calyx 5-partite; petals 5; stamens 5 or 10, perigynous; carpels free, 3-5, 1-celled; ovules 2, collateral, ascending from the base of the inner angle of the cell, orthotropous. Capsule usually solitary, follicular, 1-seeded; seed arillate, exalbuminous. Trees or shrubs, leaves alternate, exstipulate, 3-foliate or pinnate (in our species); leaflets entire; flowers small, in cymes or panicles.

88. **BRYSOCARPUS**. Shrubs with pinnate leaves, cymose inflorescence; stamens 10, sub-equal, or 5 longer and 5 shorter; carpels 5; capsule dehiscing by a dorsal suture; seeds red, fleshy and arilliform below the middle.

**B. orientalis**, Baker. A small tree from the northern districts with pinnate leaves 15-24 c.m. long, and 21-25 leaflets in nearly opposite pairs, each 2-3 c.m. long, 1-1.5 c.m. wide, elliptical, rounded at both ends and glabrous. Pod 1-2 c.m. long, slightly curved.

**B. ovatifolius**, Baker. Leaves pinnate, 6-8 c.m. long, with 7-9 ovate acute leaflets 2 c.m. long, glabrous and shortly petiolate. Pod oblong-cylindrical, sessile, glabrous, 1.5 c.m. long, 7 m.m. diameter. Nyasaland.

**B. maximus**, Baker. A small tree with pinnate leaves 10-12 c.m. long, and 7-9 obovate acute glabrous leaflets 3-4 c.m. long, 2-2.5 c.m. wide. Pod oblong-cylindrical, sessile, 2 c.m. long, 7 m.m. diameter, curved. Rovuma.

89. **AGELÆA**. Leaves petiolate, 3-foliate. Stamens 5 (in our species), free, included; carpels 3-5, hairy; capsules 1-2, velvety; seed erect, fleshy and arilliform from the base above the middle.

**A. Lamarkii**, Planch. A climbing shrub. Leaves 3-foliate, the terminal one obovate, 7-10 c.m. long, 5-7 c.m. wide on a 3 c.m. petiole, the lateral ones sessile, unequal sided, all glabrous above and nearly glabrous below. Flowers small, in profuse panicles. Pod oblong, velvety. Zambesia.

## FAMILY XXVIII.—LEGUMINOSÆ.

Flowers regular or irregular, often papilionaceous, hermaphrodite or polygamous. Calyx lobes 5, or 4 if 2 connate. Petals usually 5, sometimes fewer or absent. Stamens usually 10, sometimes fewer or many, hypogynous or perigynous, free or variously connate. Pistil superior, consisting of one 1-celled carpel, usually flattened, with 1 or more axile ovules attached to its ventral suture. Style terminal. Fruit usually a legume, 1 or several-seeded; seeds exalbuminous. Leaves usually pinnate or 1-3 foliate, usually alternate, and stipulate. A vast family and including trees, shrubs and herbs, and represented almost everywhere, usually taking a high place with regard to the number of species in any flora. The trees are mostly tropical or sub-tropical, and the tree-flora of this Province may be described as a Leguminous one, these trees taking a prominent place everywhere, and forming in places large almost pure forests of Acacias in the south, of Brachystegia in the M'Chopes, and of Pterocarpus in the north. Of its 400 genera 83 are South African and 141 Tropical African, 48 of these being common to both, only a few of these, however, being arborescent. The Family includes such a variety of useful plants that only the more important can be enumerated here. Among food materials for man or stock are Peas, Beans, Lentils, Carobs, Tamarinds, Clover, Lucerne, Tares, &c. Senna and others are medicinal; the bark of many species of Acacia is used in tanning; gums are yielded by Acacia and several other genera; Indigo, Camwood and Logwood are important dyes, and the number of active poisons is very considerable. Valuable timbers, usually with black or dark heartwood, occur in most warm countries, and this Province is well provided with such.

The Family divides more or less naturally into 3 Sub-Families, viz. :—

1. Papilionaceæ. Stamens 10 (many in Swartzia and Cordyla). Corolla irregular, papilionaceous; petals imbricate, the upper exterior.
2. Cesalpinia. Stamens 10 or fewer. Corolla sub-regular, imbricate, not papilionaceous, the upper petal within the others.
3. Mimosæ. Flowers minute in dense heads or spikes. Corolla regular, valvate in aestivation. Stamens 10 or many. Leaves 2-pinnate.

## SUB-FAMILY I.—PAPILIONACEÆ.

Stamens 10 (many in Swartzia and Cordyla), free or variously connate. Corolla irregular, usually papilionaceous; petals 5, free or somewhat adnate to the staminal tube, usually arranged as 1 *standard*, outside in bud, 2 *wing-petals*, and 2 lower petals, frequently coherent by their lower edges and forming the *keel*. Leaves simple, 3-foliate or imparipinnate (in our trees).



90. **INDIGOFERA.** Shrubs or shrublets having usually imparipinnate but sometimes 3-foliate or 1-foliate leaves, and axillary few or many-flowered racemes or clusters of white, rosy, or purple flowers. Calyx small, green, 5-toothed. Standard roundish, reflexed; wings narrow, partly adherent to the keel, which has a wart or spur on each side near the base; upper stamen free, the other 9 connate; connective with a glandular point. Ovary sessile, usually many-ovuled, sometimes 2 or few-ovuled. Pod usually linear, terete or more or less flattened, dehiscent, the seeds often separated by septa. Pubescence often strigose. A large tropical and sub-tropical genus of herbaceous or woody undershrubs, never of timber size, but of interest as the source of indigo, which is obtained from the macerated leaves of several (or many) species. Among those which yield commercial indigo are *I. tinctoria*, *I. anil*, *I. hirsuta*, *I. endecaphylla*, and *I. arrecta*, all of which occur in the Province, but the presence of colour is not known to the natives, who have no use for these plants. In the "Flora of Tropical Africa" the two first-mentioned above are spoken of as cultivated; this does not apply here however, for I did not see a single plant of any Indigofera under cultivation. The native names appear to be more or less generic, and are, 6, Nkaromeba; 10, Sa-wayo. There has of late been a demand from India for seed of colour-yielding Indigoferae, and the culture of plants for seed may be worth attention even though the cost of labour may prevent actual indigo extraction locally. See "Forest Flora of Cape Colony," 199, Plate LIV. fig. 3.

91. **DALBERGIA.** Trees, shrubs or climbers, often spine-bearing, and having alternate imparipinnate leaves with alternate or sub-opposite leaflets, and corymbose axillary or terminal panicles of small white or yellow flowers. Calyx 5-toothed, the teeth unequal, the lower one longest. Petals clawed, the side ones narrow; the keel petals connate at the point, enclosed in the standard. Stamens 10, connate, the tube having 1 or 2 slits, or 1 stamen absent. Ovary stalked, 1-3 ovuled. Pod compressed, oblong, usually 1-seeded, not winged, indehiscent. Many tropical species, mostly climbing forest weeds, but various Indian and Brazilian species yield valuable timbers, usually having black or purple heartwood; the best known is the Sissoo tree (*D. Sissoo*, Rox.), now extensively cultivated in India. Of the 5 species recorded from this Province 4 are climbing shrubs, often monkey ropes, but in the absence of support forming semi-erect shrubs, to which the names, 6, Tiriane; 10, Sambelemu, are given. A similar rambling shrub is *D. obovata*, E. Mey, common in Lourenzo Marques and M'Chopes. See "Forest Flora of Cape Colony," 199, Plate LI. fig. 2. An erect unarmed shrub 3-5 metres high in the northern forests, and constantly bearing fruit-like galls, but not seen in flower or fruit, is believed to be a *Dalbergia*, and is known as, 10, Munyenye.

**D. melanoxylo**n, Guill. & Perr., has the reputation of being one of the valuable timbers of this Province, and is known as, 1, Ebony; 2, Grenadilha; but though constantly looked for I found nothing to answer its description, and doubt its presence in any quantity. It is thus described in "Flora of Tropical Africa":—"A copiously branched bush or small tree, 15-20 feet high, with stout woody glabrous branches and long sharp woody spines. Petioles under  $\frac{1}{2}$ -in., glabrous; leaflets 9-13, short stalked, oblong or obovate,  $\frac{1}{2}$ - $\frac{3}{4}$  in. long, both ends rounded, often emarginate, sub-coriaceous, both sides glabrous, veins beneath raised. Flowers in copious terminal and axillary panicles, the latter equalling or shorter than the leaves. Pedicels a line long, slender, glabrous, bracteolate. Calyx 2 lines deep, glabrous, upper teeth deltoid, the lowest lanceolate. Corolla yellow, slightly exceeding the calyx. Pod  $\frac{3}{4}$ -2 in. long,  $\frac{1}{2}$ -in. broad, blunt or sub-acute, with a long pedicel, the valves glabrous and membranous. Seeds 1-4. Mozambique, *Dr. Peters*; Zambesi-land, *Dr. Kirk*; *Dr. Meller*," and also recorded from Senegambia, Nubia and Abyssinia.

92. **MILLETTIA.** Trees having imparipinnate leaves, usually opposite stipellate leaflets, and terminal panicles of purple flowers. Calyx companulate, with broad lobes. Standard large, roundish, reflexed; wings smaller; keel still smaller, incurved. Stamens monadelphous, the upper stamen free at the base but not above. Ovary many-ovuled, style inflexed. Pod compressed, several-seeded, ligneous, tardily dehiscent. Stipules small.

**M. caffra**, Meisn. *Vern. names*—5, Umsia; 6, 7, 8, Songa; 13, Umzimbiti, or Umzimbeet. Usually a small gnarled tree preferring shallow shale soils; occasionally a large tree on alluvial. Leaves 15 c.m. long, 10-12 c.m. wide, the leaflets in about 5 pairs, oblong-acute, glabrous above, silky below, shortly petioled on a pubescent rachis. Panicles foxy-pubescent, terminal, 8-12 c.m. long. Flowers purple; calyx and vexillum silky, calyx-lobes acute. Pods 15 c.m. long, 3 c.m. wide, several-seeded, woody, dark-velvety, the valves twisting much on dehiscence. Seeds 2 c.m. long, oblong, flat. Cut roots make new plants. Used largely in Natal for wagon spokes, &c. See "Forest Flora of Cape Colony," page 203 and Plate IV. Present but not common in Lourenzo Marques district, Lower Gaza, M'Chopes and Inhambane, usually as a bush or small tree.

93. **SALDANIA.**<sup>1</sup> (New genus.)<sup>2</sup> Flowers not seen; peduncle 1-flowered, bracted near the middle; calyx 5-fid, segments acute; legume flat, dehiscent, several-seeded (3-5), set with short spines or strong hairs. Leaves abruptly pinnate. An unarmed tree.

<sup>1</sup> Named after Dr. Saldanha, through whose influence the development of the Province has been actively taken in hand, and on whose fine farm at Umbelusi this tree grows.

<sup>2</sup> **SALDANIA.** (Gen. nov.) Arbor inermis. Pedunculo unifloro, ad medium bracteato. Calycis 5-fidi segmentis acutis. Legumine dehiscente plano, aculeis brevibus vel setis vestito, 3-5-spermo. Foliis abrupte pinnatis. Floris structura non cognita.

**S. acanthocarpa.** (New species.)<sup>1</sup> Vern. names—4, Palase; 15, Hlandhlovu. A small unarmed tree 3-6 metres high, with stem diameter up to 15 c.m., and rough corky bark. Leaves abruptly pinnate, 4-5 c.m. long, 2 c.m. wide; leaflets in 5-7 pairs, mostly equal, obliquely elliptical or trapeziform, rounded or sub-acute; stipules lanceolate, permanent; peduncle 1-2 c.m. long, 2-bracted near the middle, 1-flowered. Legume 4-5 c.m. long, 7-10 m.m. wide, straight or falcate, 3-5 seeded, bristly. Frequent in the Umbelasi Valley and thence to the Lebombo Range (extra-tropical). Flowers not seen, but it belongs to Papilionaceae, though the general appearance is that of an *Acacia*. Sim 6222.

PLATE XXXIII. A. 1, Fruiting branch; 2, Legume, open.

94. **SESBANIA.** Calyx campanulate, with short; petals clawed, standard large, rounded, wings oblong, keel blunt. Stamens diadelphous. Pod linear, narrow, terete, 15-30 c.m. or more long, dehiscent, many-seeded. Leaves imparipinnate, with many leaflets. Mostly herbaceous plants, annuals or undershrubs growing in or near water.

**S. ægyptiaca**, Pers. A small glaucous tree 3-6 metres high and sometimes 30 c.m. diameter, growing on the moist alluvial banks of the Umbelusi River. Leaves 8-10 c.m. long, with opposite, sub-opposite, or alternate glabrous oblong mucronate leaflets 2 c.m. long, and pubescent rachis, petiolules and stem. Peduncle 8 c.m. long, pedicels 1-2 c.m. long; legume 15-20 c.m. long, glabrous, narrow-linear, acute. A soft-wooded perishable tree usually growing where it is under water during flood.

95. **HERMINIERA.** A monotypic Tropical African genus, unknown to me but described as:—"Calyx deeply divided into 2 sub-entire lips. Standard orbicular, deeply unguiculate; wings obliquely obovate, broad, about equaling the standard; keel broad, obtuse or obliquely sub-rostrate, its petals easily separating. Stamens in 2 bundles of 5 each; anthers uniform. Ovary stalked, multi-ovulate; style filiform; stigma terminal, minute. Pod broad, linear, nearly flat, spirally curved, the square articulations finally separating."

**H. Elaphroxylon**, Guill. & Perr. An erect shrub 3-7 c.m. high with spinose woody branches densely clothed with weak spreading yellowish bristles. Thorns 3-6 m.m. long, principally in pairs at the base of the leaves, horny, yellowish, sub-conical. Leaves pinnate, with bristly rachis 8-10 c.m. long, and 10-20 pairs of linear-oblong leaflets 1-2 c.m. long, 4-6 m.m. wide; flowers 1-3, sub-corymbose. Pod 5 c.m. long or more, 1 c.m. wide, 12-15 articulated, once or more spiral, flat, pubescent. Grows in or near water. Very ornamental from its large bright-coloured flowers. Timber very light. Recorded from Zambesi-land; also from West Africa and White Nile.

**Abrus precatorius**, Linn. The *Lucky Bean*, with bright scarlet seeds 3 m.m. diameter, is abundant throughout the Province as a climbing shrub. The seeds are often set in jewellery abroad.

96. **BAPHIA.** Easily separated from all its local congeners by its simple leaves. Stamens 10, free; pod obliquely linear lanceolate with the lower edge straight; pointed, woody, compressed, dehiscent. Trees or shrubs.

**B. ovata.** (New species.)<sup>2</sup> Vern. name—6, Chivari or Chevira. A medium to large glabrous tree. Leaves 2.5-5 c.m. long, widely ovate, not tapering at the base. Flowers not seen. Inflorescence a short terminal panicle. Pods shortly stalked, 10 c.m. long, 2 c.m. wide in the upper portion, less below, sharp pointed, 1-2 seeded, woody, tardily dehiscent. Seeds 1.5 m.m. long, oblong, compressed. Timber valuable. Quisica and occasionally through M'Chopes, usually near water. Sim 5279.

PLATE XLIX. A.

**B. racemosa**, Hochst. Vern. name—13, Isifiti. A small tree or more frequently a shrub; leaves 5-9 c.m. long, lanceolate to ovate, tapering below to a 1-2 c.m. petiole. Flowers in few-flowered terminal and axillary racemes, white with a yellow spot at the base of the standard, and strongly violet scented. Pod similar to that of *B. ovata*.

<sup>1</sup> *S. acanthocarpa*. (Sp. nov.) Arbor parva, 3-6 m. alta, cauli 15 c.m. diam.; cortice aspera, suberea; foliis paripinnatis, 4-5 c.m. longis 2 c.m. latis; foliolis 5-7-jugis, sub-æqualibus, oblique ellipticis vel trapeziformibus, obtusis vel subacutis; stipulis lanceolatis, persistentibus; pedunculo 1-2 c.m. longo; legumine 4-5 c.m. longo, 7-10 m.m. lato, recto vel falcato, setoso. Frequens; a valle Umbelasi ad Montes Lebombo.

<sup>2</sup> *Baphia ovata*. (Sp. nov.) Arbor media vel magna, glabra; foliis 2.5-5 c.m. longis, lato-ovatis; floribus haud visis; inflorescentia apicali paniculata, brevi; fructibus breviter pedunculatis, 10 c.m. longis, sursum latioribus (2 c.m.), acutis, 1-2 spermis, ligneis, serius dehiscentibus; seminibus oblongis, 1.5 m.m. longis, compressis, juxta aquam; Quisica et M'Chopes, passim. Tab. XLIX. A.

The wood is highly spoken of by Wood ("Natal Plants," tab. 19), and the timber of *B. nitida* is the *Camwood* of Sierra Leone. *B. racemosa* occurs in Natal Coast districts and is reported from the Batoka country. Harv. Thes. tab. 20; "Forest Flora of Cape Colony," 200, Plate CXXXVII. fig. 8; "Natal Plants," Plate 19.

**B. Kirkii**, Baker. A shrub with spathaceous calyx and densely tomentose branches is described from Zanzibar specimens and may extend into this Province, though I am not aware that it has been found.

97. **ERYTHRINA**. Trees or shrubs, often prickly, having usually soft timber, or in some cases large pithy subterranean stems, with more slender leafy branches above ground. Leaves pinnately 3-foliate, usually deciduous, with a gland at the base of each leaflet. Stipules small, free. Flowers in stalked, many-flowered racemes, very showy, scarlet, red, yellow, or white, often produced before the leaves. Calyx entire or split; with or without 2 or more lobes. Standard large, flat and reflexed, or infolded and elongated, much larger than the narrow wings or the shorter connate or free keel petals. Stamens connate below only, with a split tube and having the upper one partly or quite free. Ovary stalked, ovules numerous. Pod stalked, narrowed at both ends and between the seeds, dehiscent. Seeds oval, red, with a black hilum. A widely dispersed, usually tropical order.

**E. tomentosa**, R. Br. *Vern. names*—13, Umsinsi (Pondoland), Um-kwaba-kwaba (Natal). A tree of stiff habit, seldom over 7 metres high, and with stem diameter up to 45 c.m. Stem bare, rugged, with leaves at the top only. Leaves very large, the terminal symmetrical, 6-9 inches wide, 4-6 inches long, the lateral oblique and rather smaller. Spike many-flowered, short; flowers dull crimson, not showy. Calyx split down one side, and having 5 slender segments. Pod 6 inches long, not prickly. Whole plant more or less tomentose. It is not easily killed by fire and consequently stands where most other kinds have been burned out, but it is never found in dense bush. Timber soft, light, useless except for brake-flocks. Recorded from Zambesi-land. "Natal Plants," 384, 385.

**E. Humeana**, Spreng. *Vern. names*—4, Indlebe-monte; 6, Insika. A shrub seldom over 3 metres high, and having the stem development mostly in the ground, with only soft branches above. Leaflets broadly ovate, or, in this Province, more frequently hastate, 6-8 c.m. long and wide, glabrous, more or less acute, with the petioles and nerves armed with hooked prickles. Racemes 10-20 c.m. long, on longer peduncles, many-flowered. Standard scarlet, infolded, 7-8 c.m. long, 1.5 c.m. wide; pod 12-15 c.m. long, 1 c.m. diameter, beaded at each seed. Used for the production of fire by friction.

**E. mossambicensis**. (New species.)<sup>1</sup> *Vern. name*—10, 11, Nenungo or Inungwa. Small tree 5-8 metres high, with rigid habit, very rough corky bark and stiff thick branches, the younger with prickles 1-1.5 c.m. long scattered on them. Petioles 5-12 c.m. long with scattered strong short hooked prickles; leaves densely rusty pubescent when young, soon glabrescent on both surfaces, the terminal leaflet on a 2 c.m. petiole is 8 c.m. long and as wide at the middle, tapering to the rounded point and shortly to the base; the side leaflets rather smaller, on 5 m.m. petioles, the lower side largest, all the leaflets 3-veined at the base. Stipules 5 m.m. long, or less, pubescent. Inflorescence lateral, pubescent in 3-5 c.m. racemes or spikes on a 7-10 c.m. pubescent peduncle. Calyx-tube 1.5 c.m. long, bracted at the base, cylindrical, densely grey-pubescent outside, glabrous inside, with 5 short oblong spreading scarlet lobes. Standard scarlet, 1.5 c.m. long, protruding only a little from the calyx-tube, and in such manner that 4 sepals spread from it, giving the general appearance of an orchid flower. Ovary pubescent. Pods numerous, moniliform, 1.5 c.m. diameter, not flattened, bursting along one side. Seeds 7 m.m. long, scarlet. Good light timber for marimbas (Native pianos) and used for making fire. Frequent from Quelimane northward. Sim 5833.

PLATE LIV. 1, Leaf; 2, Inflorescence; 3, Calyx; 4, Petals,  $\times 3$ ; 5, Ovary,  $\times 3$ ; 6, Pods.

**E. Livingstoniana**, Baker. *Vern. names*—6, 7, 8, Lidocoda and I-chonti. Sometimes an enormous tree 20-25 metres high, 3 metres diameter with clean shining greenish bark, set with occasional large thorns 2-3 c.m. wide and deep, consisting of successive corky lairs with a sharp point. Prickles either nearly absent or more or less numerous on the younger branches and rachis. Stipules 1.5 c.m. long, lanceolate; petiole 8-20 c.m. long, swollen at the base, and with 2 glands below the pair of side leaflets and at the base of the upper one, which is 5 c.m. above the others. Upper leaflet 12-18 c.m. wide, 10-12 c.m. long, more or less 5-lobed, oblong, with a conical blunt upper lobe. Side leaflets obliquely 3-4 lobed, 10-12 c.m. wide and long, shortly petiolate. Raceme when in fruit 60 c.m. long, with swollen

<sup>1</sup> *Erythrina Mossambicensis*. (Sp. nov.) Arbor parva, 5-8 m. alta, rigida; cortice asperima, suberca; ramis rigidis crassis, junioribus aculeis 1-1.5 c.m. longis sparsis armatis; petiolis 5-12 c.m. longis, aculeis brevibus aduncis armatis; foliis junioribus pubescentia ferruginea densa vestitis, mox in utraque pagina glabrescentibus; folioli picalis 8 c.m. longi et lati ovato-orbicularis petiolo 2 c.m. longo; foliolorum ceterorum paullo minorum inequalitatum petiolis 5 m.m. longis; foliolis omnibus 3-venis; stipulis 5 m.m. longis vel brevioribus, pubescentibus; inflorescentia laterali, pubescente, racemi vel spicae 3-5 c.m. longi pedunculo 7-10 c.m. longo; floribus bracteatis; calycis tubo 1.5 c.m. longo, cylindrico, extus pubescentia densa cana vestito, intus glabro; calycis lobis 5 brevibus, oblongis, patentibus, coccineis; vexillo coccineo, 1.5 c.m. longo, e tubo calycis breviter protruso; petalis cacteris divergentibus in forma floris orchidis; ovario pubescente; fructibus multis, moniliformibus, 1.5 c.m. latis, non compressis, uno latere dehiscentibus; semine 7 m.m. longo, coccineo. Frequens a Quelimane septentrionem versus. Tab. LIV.



nodes and several pods; pod 2-valved, dehiscent, 10-30 c.m. long, consisting of 1-6 globose cells separated by narrow constrictions, and having a 5-10 c.m. barren portion at the base, and a 3 c.m. acute point. Seed scarlet, 2 c.m. long, 12-14 m.m. wide. Present but scarce in the M'Chopes and Inhambane districts (extra-tropical); also in Quelimane, Magenja da Costa, Nhamacurra, and in the Zambesi and Shire Valleys.

PLATE XLVIII. 1, Leaf; 2, Fruiting raceme and pod; 3, Scarlet seed; 4, Thorn; 5, Tree, general aspect.

98. **CAJANUS**. Two upper calyx-teeth connate. Standard round, reflexed. Upper stamen free, others connate. Ovules many. Style glabrous. Pod linear, compressed, 2-valved, dehiscent, with transverse constrictions. Leaves 3-foliate.

**C. indicus**, Spreng. *Vern. names*—4, Kolokoto; 6, Ndoti; 10, Boere. A shrub 3-4 metres high, frequent in cultivation and often naturalised where cultivation has been abandoned. Leaflets oblong, 5-8 c.m. long, pointed, glabrous above, canescent below. Racemes few-flowered; standard brownish yellow. Legume 8 c.m. long, 1.5 c.m. wide, pointed, 3-6 seeded, pubescent. Seeds used in native cookery, like lentils. Never timber size, but its wood is used further north for the production of fire by friction. It occurs throughout the Province and is cultivated by Indians in Natal.

99. **PTEROCARPUS**. Unarmed trees, having imparipinnate (or simple) leaves, with alternate side-leaflets; terminal or axillary racemes or panicles of yellow flowers; and distinctive usually 1-seeded pods having a wide and nearly circular membranaceous wing surrounding each. Calyx turbinate, the upper 2 teeth somewhat connate. Corolla yellow; standard rounded, keel petals nearly free; stamens connate in a slit tube or with 1 stamen more or less free. Ovary with several ovules; seed 1 (or sometimes 2) seeded. Pod indehiscent, somewhat compressed, sometimes bristly, with a wide thin wing all round, and the style lateral or even near the stalk.

**P. erinaceus**, Poir. *Vern. names*—4, Thondo; 10, Imbilo; 11, Moqombire-bire; 15, Shuiaan. A more or less deciduous tree 15-20 metres high, with straight bole 30-45 c.m. diameter spreading crown, and pubescent branchlets. Leaves unequally pinnate; rachis slender, 20-30 c.m. long; leaflets 9-13, sub-opposite or alternate, 4-8 c.m. long, elliptical-lanceolate to obovate, glabrous above and ultimately glabrous below. Flowers in terminal panicles with racemose branches. Pods often several together, each with a firmly membranaceous wing an inch wide all round, nearly circular, 10 c.m. wide (including wing); the stigma near the stalk; the central seed-bearing portion 12 m.m. diameter and densely echinate with bristles 10-12 m.m. long; smaller bristles or hairs are on the inner part of the wing and towards the stalk and stigma; other portions of the wing are glabrous and more or less reticulated.

In the "Flora of Tropical Africa" *P. angolensis* is included as a synonym, and concerning this Miss L. S. Gibbs says: "P. angolensis A.D.C. which has often been quoted as a synonym of *P. erinaceus*, Lam., is easily distinguished by the larger flowers and much larger fruit, which has more bristles in the centre and a broader wing." All the trees seen throughout Mozambique Province appeared to be alike, and with less variation than most species. Present though not abundant throughout the extra tropical parts of the Province, abundant through the tropical districts and in some places as in the Robe Forest, near Arenga, Magenja da Costa forming almost pure forest. A valuable and durable timber, found in great abundance, and certainly the most valuable asset the Province has in its tropical forests. It extends into Natal, Swaziland, the Transvaal, and to the West Coast, and (including *P. angolensis*) from the coast to the Matopos. "Produces the African gum Kino and the wood is much used. See R. Brown's remarks on Oudney's Travels, p. 29, and Hooker in Gray's Travels in West Africa, p. 395."<sup>2</sup>

PLATE LIX. 1, Leaves; 2, Pod.

**P. lucens**, Guill. & Perr. A small tree with glabrous branches and glaucous leaves 10-15 c.m. long, having 3-7 oblong leaflets 4-5 c.m. long, glabrous above and at first canescent under. Flowers numerous in short racemes. Pod nearly round, 3-4 c.m. long; wing 6-8 m.m. wide, glabrous; style slightly oblique. Senna, *Dr. Kirk*!

100. **BOLUSANTHUS**. Monotypic, founded on the following tree:—

**B. speciosus**, (Bolus), Harms, Rep. Nov. Spec. Reg. Veg. II. p. 15. *Vern. names*—1, Rhodesian Wistaria (Miss Gibbs); 3, Loed hout, Oliphants hout; 4, Goshwan; 15, Mohoshle. A small deciduous tree, 6-10 metres high, usually with a straight bole 20-30 c.m. diameter and spreading at the top only. Flowers and leaves appear together in spring; leaves 15-20 c.m. long, imparipinnate; leaflets 9-17, lanceolate, petiolate, acute, 5 c.m. long, 1.5 c.m. wide; stipules pubescent. Racemes 15-20 c.m. long, many-flowered, drooping, resembling Wistaria; pedicels 2-2.5 c.m. long; flowers without scent; calyx with 2 upper, and 3 smaller lower teeth. Corolla

<sup>1</sup> Botany of Southern Rhodesia, Linn. Soc. Jour.: Bot. XXXVII. Nov. 1906.

<sup>2</sup> "Flora of Tropical Africa," II., 240.



violet coloured; standard obovate; side petals with an auricle on each side at the base, that on the upper side somewhat hooked; lower petals free, auricled at the base. Stamens all free, one standing separate. Ovary pubescent with about 6 ovules. Pod dehiscent, 5-7 c.m. long, flat, several-seeded.<sup>1</sup> Never large, but a valuable timber and in demand. Frequent in Maputa and Marracuene; especially toward the Lebombos, less common near Lourenço Marques, and not noticed north of the Limpopo, though being deciduous and leafless while I was there it may have been overlooked. Occurs also in the Transvaal and Rhodesia.

PLATE L. A. 1, Flowering branch with partly developed leaves; 2, Flower; 3, Section of pistil; 4, Stamens; 5, Upper pair of petals; 6, Lower pair of petals; 7, Pistil; 8, Flower, petals removed; 9, Stamen,  $\times 2$ ; 10, Stipule,  $\times 5$ .

101. **LONCHOCARPUS.** Trees and woody climbers with imparipinnate leaves; opposite stipellate leaflets; pendent racemose or paniculate inflorescence; and indehiscent or tardily dehiscent woody pods. Calyx campanulate; standard rounded; keel petals slightly coherent. Stamens monadelphous, the upper stamen free at the base. Ovary somewhat stalked, with several ovules. Pod woody, several-seeded, sometimes wide on the upper side.

**L. laxiflorus**, Guill. & Perr. *Vern. name*—4 and 15, Panda. A small tree 5-10 metres high, with straight stem 30-45 c.m. diameter, grey bark, and glaucous more or less deciduous foliage. Leaves pinnate, 1-3.5 foliate, with peduncle 2-5 c.m. long, rachis 2-stipellate below the upper leaflet and at each pair of leaflets; leaflets varying much with age and position from widely lanceolate, acute, 3-5 c.m. long, to ovate or obovate, rounded or bluntly pointed, 8-15 c.m. long, 4-8 c.m. wide, glabrous and finally subcoriaceous. Panicles terminal, 10-15 c.m. long, spreading, many flowered; flowers light blue, sweetly scented; side and lower petals eared; stamens connate  $\frac{2}{3}$  their length, upper one partly free. Pod flat, 5-10 c.m. long, 2 c.m. wide, with a thick upper suture, 1-3 seeded; seeds reniform, flat, 1-5 c.m. long. This looks a promising tree, but is practically a forest weed since it has no value. The timber is useless and not durable, and will not burn; the tree reproduces itself freely from seed, and also every cut root grows and stumps are difficult to kill. Although the flowers are rather pretty, Wistaria-like, this is a tree which it is well to be rid of. Abundant in Lourenço Marques, Maputa and Marracuene; not noticed north of the Limpopo, but probably present and deciduous during my visit, as it is recorded from Zambesi-land, *Kirk!* Mozambique, *Peters!* as well as from Abyssinia and West Africa. Capassa violacea, Klotzsch in Peters' Mossamb. Bot., 28, t. 5; L. Philenoptera, Benth.

PLATE L. B. 1, Panicle and young leaves; 2, Old leaf; 3, Side petal; 4, Lower petals; 5, Stamens; 6, Pod; 7, Seed.

**L. mossambicensis.** (New species.)<sup>2</sup> *Vern. names*—6, Chicuswa; 10, 11, Pangira, Mpangeli. A valuable timber tree 20-30 metres high, with straight nearly white stem 20-40 c.m. diameter. Leaves 30-45 c.m. long, imparipinnate, with 3-5 pairs of leaflets and an obovate terminal one, which is often 15 c.m. or more long, others oblong, obovate or elliptical, shortly petioled, 8-10 c.m. long, 5-8 c.m. wide, glabrous above, silky below, and with 2 stipellae on the rachis at each pair of leaflets and below the terminal one. Inflorescence on a rachis 5 c.m. long, many flowered, described to me as like Wistaria; Pod 20-35 c.m. long, 2-5 c.m. wide, flat, hard, woody, indehiscent (or tardily dehiscent), tapering to the base, and rounded with a short point at the apex, 4-8 seeded, densely rufous-velvety when young, warted and glabrescent when mature; 4-5 m.m. diameter, or rather more at the seeds. Seeds 2-2.5 c.m. long, 2 c.m. wide, compressed, brown, glabrous, exalbuminous; pod finely silky in the cell around the seed, adnate if not connected between the seeds. Mentioned in "Flora of Tropical Africa," II., 243, under L. macrostachys, Hook. Planted from stem cuttings along the roads as a shade tree at Quisico; frequent in M'Chopes and Inhambane (extra-tropical), and abundant in the forests of Quelimane, Magenja da Costa and Nhamacurra (tropical). This and various other trees have the name Pao ferro (= ironwood) applied to their timber on account of its hardness. Sim 5382.

PLATE LIII. 1, Leaf and fruit; 2, Seed.

102. **DERRIS.** Shrubs or climbing shrubs, with imparipinnate leaves, axillary and terminal panicles of white or rose-coloured flowers, and oblique, flat, oblong, somewhat winged, indehiscent pods, containing one or few seeds.

<sup>1</sup> In the January, 1907, number of the "Transvaal Agricultural Journal" there is a coloured plate with a short description of the tree.

<sup>2</sup> Lonchocarpus Mossambicensis. (Sp. nov.) Arbor 20-30 m. alta, cauli erecto paene albo, 20-40 c.m. diam.; foliis imparipinnatis, 30-45 c.m. longis; foliolis 3-5 jugis, foliolo apicali obovato 15 c.m. longo, caeteris oblongis, ellipticis, breviter petiolatis, 8-10 c.m. longis, 5-8 c.m. latis, in pagina superiore glabris, inferiore sericeis, stipellatis; inflorescentia eae Wistariae simili; legumine 20-35 c.m. longo, 2-5 c.m. lato, plano, duro, ligneo, non vel serius dehiscente, basi angustiore, apice, subacuto, 4-8 spermo, juveni pubescentia densa rufa velutina vestito, maturo verrucoso et subglabro; semine 2-2.5 c.m. longo, 2 c.m. lato, compresso, fusco, glabro; albumine nullo. M'Chopes et Inhambane (extra trop.), Quelimane Magenja da Costa et Nhamacurra (trop.); frequens in sylvis; prope Quisico ad vias posita. Tab. LIII.

**D. uliginosa**, Benth. A wide-climbing shrub with glabrous leaves having 3-5-7 oblong, pointed, shortly petiolate leaflets 5-10 c.m. long, 3-5 c.m. wide, rounded or cordate at the base. Panicles 10-20 c.m. long, narrow, with shortly pedicelled rose-coloured flowers. Pod 3 c.m. long, 2-5 c.m. wide, compressed, glabrous; the upper suture straight and narrowly winged, the lower rounded and not winged. Seeds 2. "Zambesi-land, banks of the Luabo, and in the Zambesi delta, *Kirk*. Stems used when beaten as a fish poison acting rapidly and effectively." Asia, Australia, and Madagascar.

103. **SOPHORA**. Represented in Mozambique Province by only one species.

**S. tomentosa**, Linn. A maritime shrub 3-5 metres high silvery-white throughout except the bright yellow petals and dark pods. Leaves 15 c.m. long, 10 c.m. wide, with 6-8 pairs of oblong, nearly sessile, silvery pubescent leaflets, and terminal one. Inflorescence a many-flowered terminal raceme 10-15 c.m. long. Stamens 10, free. Pods 7-12 c.m. long, 2-6 seeded; each pod constricted between the seeds, with a stalk 2 c.m. long and a point 1-5 c.m. long. *S. inhambanensis*, Klotzsch, Bazaruto, Bartholemew Dias, Sofala and Zambesia. A most effective plant for horticultural work where it will grow.

PLATE LI. 1, Flowering raceme; 2, Fruiting branch.

104. **SWARTZIA**. An American genus with only one African species.

**S. madagascariensis**, Desv. *Vern. name*—10, Naquada. A tree 10-20 metres high, with erect, nearly white stem, 20-40 c.m. diameter; imparipinnate leaves, few flowered racemes, and long terete pods which easily identify the tree. Leaves alternate, 16-20 c.m. long, 10 c.m. wide, with 9-11-13 leaflets; the terminal one 5-7 c.m. long, 2-5-4 c.m. wide, obovate; the others elliptical, minutely mucronate, 4-5 c.m. long, 2-5 c.m. wide, with petioles 3 m.m. long. Youngest wood, rachis, petioles and veins densely but finely silky-pubescent; under surface of leaf sparingly so. Pod 15-30 c.m. long, indehiscent, terete or very bluntly 4-sided, 15-20 m.m. diameter, rounded and mucronate at the point, with the seeds in a central cell, having an empty cell on each side and a glabrous brown leathery coat, somewhat fleshy inside.

This and several other trees yield very hard dark timber known as Pau-ferro, (=iron-wood) and probably on this account I found natives confuse this and the dissimilar *Lonchocarpus mossambicensis*, some giving the names Pangira and Naquada to either. The Portuguese name *Scopira* belongs to one or both of these. Abundant in most of the forests north of the Zambesi; not seen in the extra-tropical districts. Recorded from most other parts of Tropical Africa.

PLATE LII.

105. **CORDYLA**. Monotypic, on the following Tropical African tree.

**C. africana**, Lour. *Vern. names*—4, Boboti; 6, Moanjwa; 10, Moroanda. A very large tree, 20-30 metres high, with an enormous spread of branches, and sometimes 1½ metres diameter of stem. Leaves alternate, simply pinnate with 10-12 or more pairs of elliptical leaflets and a terminal one, all 4 c.m. long, 12-20 m.m. wide, shortly petioled, and either rounded, bluntly pointed, or slightly emarginate at the apex. Racemes axillary near the points of the branches, 2-20 flowered, secund, the flowers all showing upward. Calyx widely cup-shaped with 4 deltoid segments. Petals absent. Stamens numerous; filaments 1 c.m. long, golden yellow, making the flowers conspicuous. Ovary obliquely pointed, stalked, 8-10 ovuled; fruit globose or somewhat elliptical, 3-4 c.m. long, 2-5 c.m. diameter on a 3 c.m. peduncle, leathery indehiscent, 1-8 seeded, the seeds lying across the fruit, and varying very much in size and form. The timber which is light and soft is that used for the construction of native pianos (6, Marimba, 10, Mangwela) and also for native drums. Nowhere abundant, but not uncommon throughout the Province; present also in Nile-land and Senegambia.

PLATE XLVI. 1, Leaf; 2, Raceme; 3, Flower, cut open, x 2; 4, Flower, slightly enlarged; 5, Fruit; 6, Section of same; 7, Large seed; 8, Tree, general aspect (reduced).

106. **ANDRADIA**. (New genus.) Calyx-tube saucer-shaped, discoid; segments 5 (or occasionally 6-7), free to the disc, petaloid, much imbricate in aestivation, at length spreading. Petals absent. Stamens 10 (or occasionally fewer), equal, free, rising from the margin of the disc; filaments filiform; anthers basifixed, cordate-oblong, with a short projecting connective, and opening by terminal lateral slits. Ovary shortly stipitate, with short bent style, 1-3 ovuled. Fruit ovoid, shortly stalked,

\* **ANDRADIA**. (Gen. nov.) Calycis tubo patelliformi discoideo, segmentis 5 (6-7) petaloideis, aestivatione late imbricatis, demum patentibus; petalis nullis; staminibus 10 (interdum paucioribus) aequalibus, filamentis liberis filiformibus e margine disci ortis; antheris innatis, cordato-oblongis, in connectivum brevem productis, fissura laterali apicem versus dehiscentibus; ovario breviter stipitato, ovulis 1-3; stylo brevi curvato; fructu ovoido breviter stipitato, vix compresso, non dehiscente, chartaceo; seminibus 1-2, in tegmine acidulo fusco inclusis, ovatis, sub-compressis, canis, glabris, duris; cotyledonibus planis viridibus; albumine copioso corneo. Foliis imparipinnatis, foliolis oppositis vel alternis.

hardly compressed, indehiscent, firmly papery, with 1-2 seeds bedded in an acidulous brown covering. Seeds ovate, somewhat compressed (or where 2 irregular in form), grey, glabrous, hard, with flat green cotyledons and abundant horny albumen. Leaves unequally pinnate, the leaflets opposite, sub-opposite and alternate.<sup>1</sup>

**A. arborea.** (New species.)<sup>2</sup> *Vern. names*—4, Mneba and Treba; 5, 6, Ziba or Inziba. A large timber tree, frequent throughout the Province, especially in the south. Leaves alternate, imparipinnate, 7-10 c.m. long, 4-5 c.m. wide, at first rusty, afterwards glabrescent; leaflets about 11, opposite, sub-opposite or alternate, more or less obliquely ovate, elliptical or oblong, usually bluntly pointed but with the point recurved, 2-2.5 c.m. long, 1 c.m. wide, with a petiole 2 m.m. long. Panicle diffuse, terminal and axillary 10-20 c.m. long, nearly as wide. Flowers 1 c.m. wide, scented. Growth-buds, inflorescence, calyx, ovary and fruit all finely rusty-pubescent. Sim 6141.

PLATE XXVI. 1, Branch; 2, Panicle; 3, Flower,  $\times 5$ ; 4, Tree, general habit (reduced); 5, Fruit.

#### SUB-FAMILY II.—CAESALPINIÆ.

Stamens 10 or fewer. Calyx 5-fid, or by union of the upper two, 4-fid. Corolla regular, irregular, or absent; petals free, equal or unequal, not papilionaceous, imbricate, the upper petal within the others; stamens 10 or fewer, free, or more or less connate. Leaves alternate, 2-lobed, pinnate or bi-pinnate. Mostly tropical or sub-tropical trees and shrubs.

107. **PELTOPHORUM.** Represented in Africa by only one species.

**P. africanum**, Sond. *Vern. name*—5, Nzeza; no name in Maputa though present. A small unarmed tree, usually 3-5 metres high, with abruptly 2-pinnate leaves; terminal racemes of yellow flowers, and flat indehiscent winged pods. All young parts densely brown-pubescent, which pubescence is gradually reduced in quantity with age, but even mature leaves are somewhat pubescent above, and silky pubescent below. Leaves alternate, abruptly 2-pinnate, with 5-8 pairs of pinnae each with 10-20 oblong sessile mucronate leaflets. Stipules 6 m.m. long, linear, and like the growth-buds densely rusty-pubescent. Racemes terminal 8-10 c.m. long, many flowered. Sepals 5, nearly equal, with a short tube. Petals obovate, wavy; stamens 10, free; filaments hairy below; ovary with 2 or more ovules. Pods 6-8 c.m. long, 2 c.m. wide, oblong, acute, flat, indehiscent, somewhat winged on both sides, 1-2 seeded, glabrous or minutely canescent, striated. Seeds albuminous. Frequent in the Lebombo Range and seen sparingly elsewhere in extra-tropical districts. Also found in West Africa. An ornamental tree, worth cultivation as such. Sim 6266.

PLATE XLIX. B.

108. **CÆSALPINIA.** Represented in this Province by only one species *C. Bonducella*, Roxb., which being barely of shrub size, and of no practical use, is hardly worth mention here. It has large 2-pinnate leaves 30-45 c.m. long; recurved prickles on the stem, rachis and inflorescence; many flowered bracted racemes; nearly regular, yellow flowers; and oblong, prickly, somewhat compressed pods 5-7 c.m. long, 3-4 c.m. wide. It is frequent near the coast or tidal rivers throughout the Province, and children use the pods as rattles.

**C. pulcherrima**, Sw. (= *Poinciana pulcherrima*, L.), is common in cultivation and is the street tree of Quelimane (where it is called *Acacia*), but is hardly naturalised anywhere. Its beautiful foliage, scarlet flowers, flat crown and long pods make it a marked feature, but somehow its beauty is not appreciated where it grows easily.

109. **CASSIA.** A very large genus of trees, shrubs and herbs, represented in this Province by 10 or 12 species of useless half-ligneous shrubs or shrublets of no importance except such as is attached to them in native medicine and superstition. They have paripinnate leaves, and axillary racemes, clusters, solitary flowers, or terminal panicles of yellow flowers. Calyx deeply 5-parted, the segments often unequal, imbricate. Petals 5, hardly equal; stamens 5, 7, 10, in the latter case the upper 3 often smaller and effete, all basifixed and dehiscing by terminal pores. Ovary elongate; ovules many; legume terete or flattened, many-seeded, dehiscent or indehiscent.

<sup>1</sup> Named after Major Frere d'Andrade, Governor-General of the Province of Mozambique, whose active interest in the development of the Province and its resources has, among its other results, been productive of this book.

<sup>2</sup> *A. arborea.* (Sp. nov.) Arbor magna; foliis alternis, imparipinnatis, 7-10 c.m. longis, 4-5 c.m. latis, primo ferrugineis, demum glabrescentibus; foliis circiter 11, plus minus oblique ovatis ellipticis vel oblongis, plerumque in mucronem obtusum reflexum productis, 2-2.5 c.m. longis, 1 c.m. latis, stipite 2 m.m. longo praeditis; panicula diffusa, apicali vel axillari, 10-20 c.m. longa, et tantum non lata; floribus 1 c.m. latis, odoratis; gemmis, inflorescentia, calyce, ovario et fructu pubescentia ferruginea subtili vestitis. Per provinciam frequens, praecipue in parte australi. Sim 6141. Tab. XXVI.



110. **BAUHINIA**. Trees or climbing shrubs easily recognised by the leaves which appear to be simple and 2-lobed, but are formed of 2 leaflets connate along their upper edges. Flowers are axillary or terminal on 1, or few-flowered or racemose peduncles. Calyx-tube various, its limb either of 5 free segments, or split at one side only and reflexed as a single spathe. Petals 5, clawed, nearly equal, white, red, or purplish. Stamens 10 or fewer, perfect or some imperfect, with free or almost free slender unequal filaments, and versatile anthers dehiscing longitudinally. Ovary stalked, several or many-ovuled. Pod flat, woody, dehiscent or indehiscent, several-seeded; seeds flattened, albuminous. A large tropical genus, widely dispersed. 1 tree, 1 shrub, and 3 sub-scandent shrubs are included in the "Flora of Tropical Africa," as from Mozambique district. The tree 1 found in abundance in the tropical districts, together with what appeared to be only 2 species of straggling shrubs, all passing under the one name Masikesi; in the extra-tropical districts only 1 species was observed, a small straggling shrub used for cordage and known as, 6, Batela; 15, Umtelem, in the M'Chopes and Lebombo, but as all except the tree were without flowers or fruit, they were not in condition for identification.

**B. reticulata**, D.C. *Vern. name*—10, 11, Masikesi. A medium-sized or small tree, seldom over 15 metres high and 30 c.m. diameter of stem, usually rather crooked and gnarled, and though of good nearly black timber, seldom of size and form to be of use. Leaf 8-12 c.m. long, 12-18 c.m. wide, glabrous above, velvety below, and about 9-veined. Young growth rusty-tomentose. Petiole and inflorescence tomentose. Raceme terminal or opposite a leaf, branched. Calyx-lobes free, or sometimes cohering. Petals white or nearly so, obovate and clawed, equal, pubescent outside. Stamens 10. Pod 8-20 c.m. long, 2.5-5 c.m. wide, with a 3 c.m. gynophore, a long point, and a dense coat of dark velvet. Seeds several. "The bark yields a tough fibre; it is also astringent and used in Medicine." Abundant from the Zambesi northward, showing preference for open glades, though sometimes found in thick forest.

PLATE XLIII. 1, Fruiting branch; 2, Medium-sized pod; 3, Tree, general aspect, reduced.

111. **BERLINIA**. Unarmed trees, with abruptly pinnate leaves; paniced racemes of handsome white flowers; and long flat coriaceous dehiscent legumes. Sepals 5; petals 5, unequal; Stamens 10, all perfect, connate at the base, except one. Ovary shortly stalked; ovules 6-8; buds enclosed between a pair of bracteoles. Several species, all Tropical African.

**B. acuminata**, Sol. Unknown to me, but recorded with a doubt from Rovuma in "Flora of Tropical Africa." It is described as a tree 7-20 metres high, almost glabrous, with simply pinnate leaves, 3-6 pairs of oval leaflets 8-24 c.m. long, 4-12 c.m. wide. Flowers in terminal simple or usually corymbosely paniced hoary racemes; posterior petal ample, 4-8 c.m. long, clawed, with cristate margin; other petals small, linear, dilated or auricled below. Legume 24-30 c.m. long, 5 c.m. wide, flat, with the ventral suture thickened and laterally ridged.

112. **AFZELIA**. Trees with abruptly pinnate leaves, terminal racemes of curiously irregular flowers, and thick woody oblong pods containing several black seeds, each set in a scarlet or yellow aril. Only one species is known to belong to this Province.

**A. quanzensis**, Welw. *Vern. names* 1, Mahogany; 2, Ompow; 4, 15, Hlafuta, or Chaputa; (Benguella? at Manhica); 5, 6, 7, 8, Inchenu, Insená, Sina, or Xina; 10, Musacosse, or Momba periwele; 11, Mugoberere. A medium sized or large tree in accordance with locality, 15-20 metres high, 40-60 c.m. diameter of stem, with a good hole and a spreading gnarled crown, perhaps regularly deciduous, but the trees vary in their leafless season. Leaves glabrous, dark green, shining, paler below, 20-30 c.m. long, with about 4 pairs of leaflets which are elliptical, rounded or bluntly pointed at the apex, shortly petiolulate, undulate and with a slender rachis, swollen at the base. Flowers in racemes, terminal on short leafy branches, 6-12 flowered. Sepals 4, 1.5-2 c.m. long, convex, finely canescent, the upper smaller. Vexillum 4 c.m. long, narrow below, widening upward and with a sharply widened lip 2.5 c.m. wide. Other petals absent. Stamens 7, of which 3 are longer than the others. Lower 2 occasionally but not regularly transformed into a club-shaped petaloid form. Pistil longer than the stamens, 4-5 c.m. long. Pod 8-20 c.m. long, 4-5 c.m. wide, 12-20 m.m. thick, dehiscent, firmly woody, 3-8 seeded, the seeds black, each set in a cavity in the shell, and having a scarlet cup-shaped aril at the base. Occurs throughout the Province, nowhere in great abundance, but always forming a factor in forestal calculations. Yields a valuable timber, and the seeds form a marketable commodity as a curiosity. A. Petersiana, Klotzsch in Peters' Mossamb. Bot. 19.

PLATE XLV. 1, Leaf; 2, Flowering shoot, in bud (leaves removed); 3, Flower; 4, Pod; 5, Seed; 6, Aril; 7, Pistil, nat. size; 8, Occasional petaloid modification of lowest pair of short stamens; 9, Tree, general aspect, reduced.

On the Lebombo mountains near Estatuene what appears to be another species of Afzelia occurs as a shrub 1-2 metres high with a large rootstock and more rounded leaflets (= 15, Ndlebe-in-hlovu), and in the kloofs below another bush 3-4 metres high (4-15 Umseq), but neither of these were found in flower or fruit.

113. **BRACHYSTEGIA.** Unarmed trees with abruptly pinnate leaves, flowers rather small in terminal simple spicate dense racemes or axillary paniculate confluent glomerules. Flowers in bud enclosed by 2 bracteoles. Calyx reduced to several minute scales; petals absent; stamens 10-13; filaments somewhat connate at the base; ovary 5-8 ovulate; pod oblong, compressed, dehiscent, woody, with a wide ventral suture. Seeds several, compressed, exalbuminous. A Tropical African genus, having fibrous bark largely used by the natives for water-boxes, drums, &c., and when beaten out and chewed it is the only cloth available in many places; it also contains tannin worth commercial attention. By the descriptions I cannot separate *B. appendiculata*, Benth., which is recorded from the Northern districts by Drs. Miller and Kirk from *B. spicæformis*.

**B. spicæformis**, Benth. *Vern. names*—5, 6, Tzontzo, Tondo; 7, 8, M-tamba; 10, Marotta, 11, Macarara. The timber is known with several other timbers as, 2, Pau-ferro (= ironwood), and the fibre as (2) Casca-pano. A tree 10-15 metres high, 20-40 c.m. stem diameter, with a rounded spreading crown where space allows. Young growth minutely pubescent, soon glabrous. Rachis 10 c.m. long; leaflets usually 4 pairs, 4-5 c.m. long, shortly petiolate or almost sessile, obliquely ovate, rounded at the point and often with about 3 veins from the base. Stipules linear, caducous. Leaves on coppice shoots twice as large, sometimes acute, and with falcate stipules 15 m.m. long, sometimes with a transverse reniform leafy appendage or auricle at the base of each. "Flowers subsessile in terminal, simple, very dense, feruginous, spiciform, ovoid or oblong ovoid racemes 1 or 2 inches long, much exceeded by the leaves. Involucral bracteoles obovate or elliptical  $\frac{1}{4}$ - $\frac{1}{2}$  inch long. Perianth usually reduced to 2 linear or lanceolate ciliate scales about one line in length, alternating with the bracteoles; occasionally a few additional minute scales are present. Stamens 10-13, unequally and distinctly monadelphous, glabrous. Ovary laxly or substrigose-pilose on a stipes of its own length; ovules 7-8." Pod 15 c.m. long, firmly woody, dehiscent, at first densely velvety, sharply and obliquely pointed, compressed, sharp one side, but 7-10 m.m. wide, with a more hardened and furrowed edge on the other. Seed flat, 2 c.m. long, oblong, exalbuminous. Though not a large tree this is perhaps the most important tree in the Province under its present circumstances; the natives in the northern districts make all their cloth from the bark of this and other species of this genus; the natives of M'Chopes make all their water-baskets, beer vessels, grain drums and cordage from its bark, and only use another tree for cloth because that is more easily prepared; throughout the Province, north of the Limpopo, they use the bark of this only for making cradles, coffins and beehives, and the timber is hard and durable and takes a part in all domestic woodwork construction. The water-basket, an implement of immense utility in the sandy districts where water is only obtainable at distances of several miles, is made by ringing the tree at two places, 4-5 feet apart, cutting down one side and removing the piece of bark intact, the two incurved sides are kept apart and in place by skewers, the ends are doubled up and the met edges sewn together at the corners, and the cross ends sewn to the skewer nearest to each, the sewing being done with fibre made of itself. These baskets last well and do not leak, and though the removal of the bark kills the tree, that is of little consequence where trees are abundant. I saw water brought up out of a well 20 metres deep by a half-inch rope of the twisted bark of the branches, which is also used for hinges and wherever fibre can be used, and a piece subjected to a strain of 400 lbs. did not break, but, of course, stretched out considerably. The bark also contains about 18 % of tannin, and as there is a vast quantity of it available, I consider that an extract might be made on the spot and shipped out with considerable profit, though I fear the shipment of the bark itself cannot be done profitably. The seed is also said to be edible. The M'Chopes country is in many places almost a pure forest of this, especially where extensive cultivation was abandoned after Gungunhamas raid, 12 years ago, and where now a dense forest of seedling trees of this species, 6-8 metres high and 15 c.m. diameter, is already in possession and ready for first thinning. The utilization of this bark is a forest problem of equal importance with the utilization of all the timber in the Province, and well deserves skilled management, and may some day bring a large revenue. The tree is abundant from the Limpopo to Inhambane, and frequent in the forests further north. It was not noticed in Lourenço Marques district, and if present at all is scarce there. The large beans have not so far been experimented on, but will, I think, be found to contain a lot of tannin, and are produced in enormous quantities and weigh well. The regrowth is excellent everywhere, and the tree is inclined to monopolise suitable districts. Found also in Zanzibar and Angola.

PLATE XLII. 1, Branch with pod; 2, Section of pod; 3, Seed; 4, Section of same; 5, Water-basket, made of bark (reduced); 7, Ring of bark, as used (reduced); 8, Half of pod, with seeds.

**B. oblonga.** (New species)<sup>1</sup> *Vern. name*—10, Mondí (not Moondi). A medium-sized tree common around Arenga and elsewhere in Magenja da Costa, 15-20 metres high and with stem diameter of 30-50 c.m. Rachis 15 c.m. long, slender, furrowed, somewhat pubescent, with about 8 pairs of sessile oblong glabrous leaflets 4

<sup>1</sup> *Brachystegia oblonga*. (Sp. nov.) Arbor 15-20 m. alta; caule 30-50 c.m. diam.; rachi 15 c.m. longa gracili sulcata subpubescente; foliis circa 8-jugis, sessilibus supra atro-viridibus nitidis infra pallidis glabris oblongis 4 c.m. longis 15 m.m. latis, basi oblique rotundatis, apice rotundatis vel subquadratis, lateribus ex æquo distantibus; venis pinnatis, vena inferiore in facie inferiore aliis majore; stipulis falcatis auriculatis. Inflorescentia haud visa. Fructu cuneato, basi 1.5 c.m. lata, apice 4 c.m. lato, oblique rostrato, altero margine tenui altero 1 c.m. lato acute bicarinato. Species cognoscenda foliorum forma. Magenja da Costa. Sim 5574.



c.m. long, 15 m.m. wide, obliquely rounded at the base, the sides parallel and rounded or somewhat square at the apex. Stipules falcate and auricled. Venation pinnate, but the lower vein on the lower side stronger than others. Leaflets dark green and shining above, pale under. Inflorescence not seen. Pod cuneate 1.5 c.m. wide below, 4 c.m. wide at top, obliquely rostrate, set at right angles to the stalk, narrow on 1 margin but 1 c.m. wide and sharply 2-edged at the other. Distinguished from the other species by the leaf form which in this is very constant. Bark used for same purposes as that of *B. spicaeformis*. Sim 5574.

**B. tamarindoides**, Welw. *Vern. name*—10, Mtagata or mutagata. A nearly glabrous tree 10-15 metres high, with 30-45 c.m. stem diameter and a branched spreading crown. Young growth pubescent. Rachis 15-20 c.m. long with 15-20 sessile lanceolate-obtuse leaflets, gradually narrower upward, rounded or pointed, 5-6 c.m. long, 8-12 m.m. wide with an unequal base, the lower lobes overlapping on the rachis. Venation, 2-3 veined on the lower side, pinnate on the upper. Leaflets pale on under surface. Flowers not seen, but described as "Subsessile, in short dense ferruginous racemes or glomerules in the upper axils or more or less confluent in terminal oblong panicles of 1 or 2 inches, scarcely overtopping the leaves. Bracts ovate, concave 1-1½ lines long. Involucral bracteoles rotundate, concave, about 2 lines long. Perianth reduced to about 5 obovate or oblong ciliate scales, 1 line or less in length. Stamens 10, glabrous; filaments connate in a very short ring at the base. Ovary subsessile, densely villous; ovules about seven." Pod 10-12 c.m. long, 4 c.m. wide, oblong, pointed, with one thick edge and about 3 seeds; 2 c.m. long, 15 m.m. wide, flat, and dark brown. Coppice shoots show leaves 45 c.m. long, leaflets up to 9 c.m. long and 3 c.m. wide, but still with the same form, and have extraordinary development of the auricle of the stipule, with or without a widely falcate foliaceous stipule 2 c.m. long. Frequent in the forests of Magenja da Costa and Nhamacurra and the bark is used for all the purposes stated for *B. spicaeformis*. Sim. 5675.

**B. pectinata**. (New species.) *Vern. name*—10, Messina. A large tree 20 metres high, with straight clean white stem 30-45 c.m. diameter; densely pubescent twigs and rachis; and pectinate leaves, 10-15 c.m. long, having 25 to 35 pairs of lanceolate acute nearly glabrous leaflets 10-12 m.m. long, 2 m.m. wide at the oblique base, and tapering to the acute point. Leaves numerous. Axillary buds (inflorescence?) enclosed in short brown pubescent imbricating scales. Inflorescence not seen. Pods as in *B. tamarindoides* but smaller, 7-10 c.m. long, 2.5-3 c.m. wide, 5-6 m.m. diameter at wide edge. Timber used for Marimbas (Native pianos), doors, &c. Magenja da Costa and Nhamacurra, not common. Sim 6099.

114. **TAMARINDUS**. Large unarmed almost glabrous trees, with evergreen abruptly pinnate, multifoliate leaves, flowers in simple or paniced racemes, and terete somewhat beaded (*through abortion*) pods containing an edible pulp. Monotypic, widely diffused through tropical countries, probably often by cultivation, but apparently indigenous in this Province as well as in other parts of Tropical Africa.

**T. indica**, Linn. *Vern. names*—1, Tamarind; 2, Tamarindeiro; 10, Egamsela, Umqwembe and Mamieba. A large or very large tree, often 1 metre diameter of stem and 20 metres high, with dense umbrageous canopy. Leaves 8-10 c.m. long, 2.5 c.m. wide, abruptly pinnate, with 10-12 pairs of oblong leaflets 2 c.m. long, 5 m.m. wide, rounded and mucronate at the apex, rounded but oblique at the base, and pale under. Racemes terminal and lateral. Flowers yellowish; Calyx-tube funnel-shaped, with 4 imbricate segments; petals 3 as long as the calyx and 2 minute. Stamens 3, connate below, alternating with minute staminodia. Ovary stalked; Ovules many. Pod 2-12 c.m. long, 1-5 seeded, somewhat constricted between the seeds, or much constricted where a seed has aborted; mucronate, terete, fleshy, indehiscent, the flesh acidulous and edible; seeds somewhat flattened, 4 angled, contained in a skin or aril, exalbuminous. Frequent in the forests of Magenja da Costa and Nhamacurra, usually on ant heaps, and strangely, the natives there did not know its pods to be edible till I showed them, when they took to them readily. Cultivated and naturalised but not indigenous at Inhambane.

PLATE XLVII. 1, Tree, general aspect (reduced); 2, Branch, with leaves and fruits; 3, Section of pod; 4, Seed.

115. **SCHOTIA**. Trees with paripinnate leaves, and short dense cymose axillary panicles of crimson flowers, each flower 1 c.m. or more long. Calyx-tube various, its limb of 4 often unequal segments imbricated in aestivation. Petals 5, almost equal, regular, rising from the mouth of the calyx-tube, imbricate. Stamens 10, free or almost so, perigynous, of two lengths, each alternate shorter; the filaments slender, the anthers dehiscing by longitudinal slits. Ovary stalked, many-ovuled, with a long subulate style and small capitate stigma. Legume oblong, flat, woody, tardily dehiscent, 1-several seeded, the margin keeled or somewhat winged, the seeds flat, exalbuminous, usually with an aril. Stipules small; bracts and bracteoles usually caducous.

\* *Brachystegia pectinata*. (Sp. nov.) Arbor magna, 20 m. alta, caule recto mundo albo 30-35 c.m. diam.: ramulis et rachi dense pubescentibus; foliis permultis, foliolis pectinatis 25-35-jugis, lanceolatis acutis 10-12 m.m. longis, basi obliqua 2 m.m. lata, in mucronem acutum productis; inflorescentia haud visa; fructibus iis *B. tamarindoidis* similibus nisi minoribus, 7-10 c.m. longis, 2.5-3 c.m. latis. Magenja da Costa and Nhamacurra. Sim 6099.



**S. capitata**, Bolle. *Vern. name*—4, Mfofof. A shrub or small tree, frequent in Lourenzo Marques and Maputa, and extending north to Inhambane. Leaves 5-7 c.m. long, with a distinctly winged rachis and 4-7 pairs of glabrous, shining, sessile, obovate oblong leaflets 1-2 c.m. long, 1 c.m. wide or less. Flowers numerous in dense compact panicles; sepals, petals and stamens crimson. Ovules about 10. Pod 5-6 c.m. long, 3 c.m. wide, elliptical, 5-8 seeded, the seeds each set in a yellow aril, the valves breaking away and leaving the keeled circumference carrying the seeds.

**S. brachypetala**, Sond. *Vern. names*—1, Boerbean; 2, Boer-boon; 4, Mfofof; 13, Umgxam; 15, Shimnum-yaan. A medium sized tree, 7-10 metres high, with stem 30-45 c.m. diameter, and rough dark bark. Leaves alternate, 10-14 c.m. long, 7-10 c.m. wide, with about 4 pairs of ovate or obovate nearly sessile leaflets 3-5 c.m. long, 3 c.m. wide. Panicles axillary and terminal, many flowered, calyx crimson; petals smaller than calyx-lobes; stamens exserted, monadelphous. Pod obliquely oblong, 5-10 c.m. long, 4 c.m. wide, nearly flat, beaked, margined on both sides, about 6-seeded, with red aril round the base of each seed. Seeds varying in form with available space. Frequent in the Lourenzo Marques district, especially on the Lebombo Range.

PLATE LV.

116. **TRACHYLOBIUM**. Trees, with the branches often ending in single or branched spines, 2-foliate leaves, terminal panicles of small flowers, and 1-2 seeded berry-like fruits.

**T. mossambicensis**, Klotzsch (in Peters' Mossamb. Bot., 21, t. 2). *Vern. names*—4-8 and 15, Lulu or Nulu, and Malila-banquenze; 10, Napige. An erect tree, 10-15 metres high, with a spreading rounded crown and a stem 45-60 c.m. diameter. Exceedingly variable in regard to pubescence, sometimes densely grey-pubescent on all young parts, sometimes quite or almost glabrous. Twigs zigzag at the nodes; in some conditions of growth the branches mostly abort into spines, either simple or more frequently 2-spined (apparently dichotomous), or sometimes several-spined. Leaves 3-5 c.m. long, 2-4 c.m. wide, ovate or ovate elliptical, bluntly pointed, oblique at the base, the outer side longest; petiole 1-3 c.m. long, petiolules 4-6 m.m. long. Calyx tube short, with 4 imbricate segments; 3 petals rounded and clawed, other 2 minute. Stamens 10, free or almost free; ovary surrounded by a hairy ring at the base; ovules 4-5. Fruit on a pedicel 1 c.m. long, not compressed, 4 c.m. long, 2-2.5 c.m. diameter, 4-5 furrowed, berry-like, 1-2 seeded, indehiscent, and said to be edible, though it did not seem so to me. Stone (or seed) 4 c.m. long, 1.5 c.m. diameter, bony. A tree with valuable hard timber; frequent in the extra-tropical districts; present but less common in the northern districts.

This is included as a synonym under *T. Hornemannianum*, Hayne, in the "Flora of Tropical Africa," but is quite distinct from the tree cultivated under that name, in having shorter, wider leaflets, always somewhat glaucous, often canescent, and in the presence of spines. *T. Hornemannianum* is credited with yielding part if not all of the Copal of East Tropical Africa.

PLATE LVI. 1, Fruiting branch; 2, Vigorous young branch, with spines; 3, Stone, cleared of flesh; 4, Section of fruit.

117. **COPIAFERA**. Closely allied to *Trachylobium*, but differing in having no petals, the calyx divided to the base, and fewer ovules. The leaves are 2-foliate, and the flowers axillary, solitary or in small racemes. Seeds sometimes arillate.

**C. gorskiana**, Benth. (= *Gorskia conjugata* Bolle in Peters' Mossamb. Bot., 16, t. 3). *Vern. name*—4, Nulwane. Seen only as a small tree, but said to grow large, much branched, and the twigs pubescent and often ending in simple, dichotomous, or branched spines similar to those of *Trachylobium*. Leaves 2-foliate, the leaflets ovate, very oblique, coriaceous, glaucous, glabrous, 3 c.m. long, 2 c.m. wide. Inflorescence axillary, or in small axillary or terminal racemes; flowers small, greenish; legume oblong, terete, 1-seeded, 3 c.m. long, 2 c.m. diameter, yellow when ripe, said to be edible. Seen only at Umbelusi, Lourenzo Marques district, but recorded from Zambesia by Drs. Peters and Kirk; the latter states that the tree affords a good hard timber.

**C. Mopane**, Kirk. *Vern. name*—16, Mopane. Unknown to me, and not seen in the lower Zamhesi forests. "A fine forest tree, the trunk often 2 ft. in diameter; extremities glabrous. Leaflets unijugate, sessile, elongate-semi-ovate, outer margin nearly straight to the narrowed obtuse apex, at right angles to the basal margin or semicordiform, coriaceous, glandular-dotted and minutely glandular-crenulate, 7-9 nerved, reticulate, 2-3½ in. long, 1-1½ in. broad at the base; petiole 1 in. more or less. Stipules oblong or ovate, 1-2 lines, deciduous. Inflorescence not seen, but probably in short axillary racemes. Pedicels ½-¾ in. Legume flat, thinly coriaceous, rather obscurely reticulate, in outline obliquely semi-circular or resembling a somewhat lengthened nautilus from the rounded gibbosity beyond the scar of the style; 1½-2 in. long; gynophore 0, or very short. Seeds reniform or oblong, testa deeply convolute-corrugate with large resinous glands; cotyledons contort-plicate, thin, not resiniferous. Near Bumbo, Angola, Dr. Welurtsch! Lupata, Zambesi, Dr. Kirk! Dr. Kirk's note appended to our specimens says that this is

'the Ironwood tree of the country, abundant in dry clay plains, forming large monotonous shadeless forests, . . . Wood in the heart dark, heavy and very durable, difficult to work. Leaves folding up at the junction of the leaflets, and turning down at the articulation with the stem; they are thus shadeless during the dry season at noon.' The fruit falls in September."

**C. coleosperma**, Benth. A large glabrous tree, with 2-foliate petiolate leaves, the leaflets falcate-ovate, 5-7 c.m. long, 2-3 c.m. wide, with pinnate venation; flowers in panicles; legumes much compressed, semi-orhicular, glabrous, 2-3 c.m. long; seeds arillate. Recorded from Zambesia by Sir John Kirk, who states that in some localities this tree "has been planted at least 100 years ago," and that the red aril is used in preparing a nourishing drink. Not seen by me in the coast districts. Miss Gibbs, in recording this from Victoria Falls, says "Evergreen tree, wood red. Seeds ex-arillate in this specimen; popular name 'Rhodesian Teak.'"

118. **ERYTHROPHLÆUM**. Unarmed trees with 2-pinnate leaves having alternate petiolulate leaflets; flowers in short dense racemes; and oblong follicular legumes containing 5-8 compressed albuminous seeds. Flowers small, sub-regular. Calyx campanulate, 5-fid; petals 5.

**E. guineense**, Don. A large tree 12-30 metres high. Pinnæ 2-4 pairs 15 c.m. long, each with 6-11 ovate-elliptical oblique leaflets 4-12 c.m. long; flowers crowded; legumes 6-12 c.m. long, 3-4 c.m. broad, follicular. "The bark is powerfully poisonous, and is administered by native tribes in widely remote regions as an ordeal." Boror, Zambesia, Dr. Peters. Not seen by me though I collected in Boror. Occurs also in Senegambia and Sierra Leone.

#### SUB-FAMILY III.—MIMOSEÆ.

Flowers regular, usually 5-merous, often minute, in dense heads or spikes. Calyx tubular below; petals valvate in aestivation; stamens 10 or many, free or connate; ovary multi-ovulate; leaves bi-pinnate. A large and widely dispersed group, well represented in this Province, mostly by trees and shrubs.

119. **PARKIA**. Flowers 5-merous congested in large numbers into dense velvety pear-shaped heads terminal on the long branches of a paniculate terminal inflorescence. Calyx tubular with short 5-lobed limb, somewhat 2-lipped. Stamens 10, free from one another but adnate to the petals and calyx-tube. Pod oblong, compressed or sub-terete, tardily 2-valved; woody. Seeds set in pulp, exalbuminous. Leaves bi-pinnate, leaflets numerous.

**P. filicoidea**, Welw. *Vern. name*—10, Mundi or Moondi (not Mond). A very large tree 25-30 metres high, and up to 2 metres diameter of stem, almost evergreen, the new leaves and flower-buds appearing a week or two after the old ones fall. Leaf 2-pinnate, 30-45 c.m. long, 20-30 c.m. wide, with about 6 pairs of pinnæ, each having a terminal point on its rachis, and 12-20 pairs of opposite oblique oblong leaflets 1-5-2 c.m. long, 5-6 m.m. wide. Rachis with 2 glands below the lowest pinnæ. Paniculate inflorescence 15 c.m. or more long, with the flowers congregated in large numbers in congested pear-shaped fascicles 7 c.m. long, 5 c.m. wide, which are at first enclosed in velvety bracts. Calyx 1 c.m. long; petals 5, narrowly strap-shaped, red; stamens 10, free; pistil shorter than stamens; ovules in 2 rows about 10 in each; fruit not seen, described as "Smooth, compressed, though not so much as in the other African species, or scarcely subterete, 10-18 in. long, 3 in. broad, on stipes of 2 in. more or less. . . . The mealy contents of the legumes are eaten, and the crushed seeds are used in native cookery." At Arenga, and through Magenja da Costa and Nhamacurra; also in the Shire Valley and in West Africa. A highly ornamental tree with beautiful foliage and curious inflorescence.

PLATE XLIV. 1, Leaf; 2, Panicle; 3, Congested inflorescence; 4, Flowers,  $\times 5$ ; 5, Stamen,  $\times 5$ ; 6, Pistil,  $\times 8$ ; 7, Section of same,  $\times 10$ ; 8, Petal,  $\times 5$ .

120. **ENTADA**. Climbers or shrubs with 2-pinnate leaves; spicate inflorescence; 5-merous flowers; 10 stamens; many ovules in each ovary; and coriaceous or woody pods, in some species very large, which break into indehiscent 1-seeded pieces leaving the persistent margin entire. Seeds compressed, exalbuminous, with a central mark.

**E. scandens**, Benth. *Vern. names*—1, Sword bean; 10, Mutagusi; 11, Mtaburi. An extensive creeper, growing near water and to the top of the highest trees. Leaves 2-pinnate, with 2 pairs of pinnæ and usually a tendril as termination of the rachis. Leaflets on the pinnæ 2-4 pairs, ovate or obovate, oblique, glabrous, 5-7 c.m. long, or the lower ones smaller. Spike axillary, 20-30 c.m. long, pubescent; flowers bracted; bean many-seeded, about 1 metre long, 8-10 c.m. wide, with wavy margins and nearly square pieces. Seed 3-4 c.m. across, 1 c.m. diameter. M'Chopes and Magenja da Costa. The liber is used for rough cordage.

"Flora of Tropical Africa," II. 315.

- E. Wahlbergii**, Harv. A glabrous climber; leaves with 2 pairs of pinnæ, each with 4-18 pairs of linear oblong leaflets 1-2 c.m. long. Inflorescence in axillary or terminal spikes or these together forming a panicle. Flowers red. Pod flat, 10-15 c.m. long, 3-4 c.m. wide, with constrictions at the margins between the seeds. Rovuma River.
- E. Kirkii**, Oliver. A glabrous climber, with about 4 pairs of pinnæ, each with 10-12 pairs of oblong leaflets 2 c.m. long, 6-7 m.m. wide. Flowers white, in dense spikes. Pod 40-60 c.m. long, 7-9 c.m. wide, the joints broader than long, the valve swollen over the seed. Zambesia, from the coast to Tete. *Dr. Kirk.*
- E. sudanica**, Schw. A bush with leaves 30 c.m. long, 5-8 pairs of pinnæ, 14-20 pairs of oblong glabrous or thinly pubescent leaflets 2-2.5 c.m. long. Spikes 6 to 15 c.m. long, flowers yellowish, almost sessile. Pod 20-35 c.m. long, 3-5 c.m. broad, constricted on both margins between the seeds; seeds many, 1-1.5 c.m. diameter, the sections of the pod much wider than long. Zambesia.
- E. natalensis**, Benth. *Vern. names*—4, i-kano, and Kakatlwaan. A vigorous climber, the stems and petioles armed with hooked prickles; leaves with 5-7 pairs of pinnæ each with about 12 pairs of oblong leaflets. Pod 12-15 c.m. long, 3 c.m. wide, glabrous, many-seeded. A forest weed, making such a dense mass as to kill the trees on which it hangs, and most difficult for a person to get through if near the ground. Frequent in the extra-tropical parts of the Province.
121. **TETRAPLEURA**. Trees with alternate, bi-pinnate, glabrous leaves, spicate inflorescence, stamens 10, anthers with an apical gland and 4-sided indehiscent legumes. Several species are West African, as is also the following :—
- T. obtusangula**, Welw. M.S.S. ("Flora of Tropical Africa," II, 331). *Vern. name*—10, Mseriale. An erect tree 10-15 metres high, with stem 30-45 c.m. diameter, and abundant glaucous fernlike foliage, as seen from below. Leaves 2-pinnate, with 3-4 pairs of pinnæ, each having about 8 leaflets on each side, alternate, shortly petioled, obovate or elliptical, 1.5-2 c.m. long, 1-1.5 c.m. wide, green above, glaucous below, the rachis and petiole slender, wiry, brown, glabrous; the secondary rachis swollen at the base. Inflorescence not seen. Pods 7-12 c.m. long, 2-2.5 c.m. wide, 4-sided or somewhat 4-ridged, pointed brown, firmly leathery, several-seeded, and showing a nearly square section. Frequent in the forests of Magenja da Costa and Nhama-curra, highly ornamental, and said to have a hard, black, useful timber.
- PLATE LVII. 1, Leaves; 2, Pod; 3, Section of same.
122. **PROSOPIS**. Trees with bi-pinnate leaves, spicate inflorescence, and subterete indehiscent pods with septa between the seeds. Mostly American; the pods of some used as cattle-feed.
- P. (?) Kirkii**, Oliv. Unknown to me; described in "Flora of Tropical Africa" as "A large tree; extremities unarmed, glabrous or obsolete-puberulous, slightly furrowed when dry, with pale ashen bark. Pinnæ 6-7 jugate, with a sessile gland between the pinnæ, rachis puberulous above. Leaflets 10-17 jugate, subsessile, oblong, obtuse, minutely pubescent,  $\frac{1}{4}$ - $\frac{1}{3}$  inch long, 1 line, more or less broad. Flowers in solitary axillary spikes 4-6 in. long (apparently insect-punctured in our specimens). Legume 5-8 in. long, 1 in. broad, flat, coriaceous, circinate, with a short hooked apiculus. Seeds compressed, ovate, with a shining testa and faint areole on each side, separated by narrow interposed cellular partitions of the endocarp. Albumen o. Shire River, Zambesi-land; Dr. Kirk."
123. **DICHROSTACHYS**. Flat-topped trees or shrubs, closely resembling in general appearance species of *Acacia*, and having axillary single spines often present, 2-pinnate leaves, numerous small sessile leaflets, spicate inflorescence, the upper flowers hermaphrodite, the lower flowers barren, and the pods twisted, linear, flat, indehiscent or opening irregularly; seeds albuminous.
- D. nutans**, Benth. *Vern. name*—4, Sasana. A small tree 2-4 metres high, having solitary axillary straight slender spines 5 c.m. long on the larger branches, and occasionally short hooked stipulate prickles in pairs on the slender twigs. Leaves bi-pinnate, 3-5 c.m. long, 3-4 c.m. wide; pinnæ 3-5 pairs, leaflets 7-12 pairs, each 3-5 m.m. long, linear. Spike 7-10 c.m. long, lower part nearly an inch wide, with pink filaments, upper part narrower, fertile, yellow. Pods numerous in clusters, much twisted, 1 c.m. wide, 5-12 c.m. long. Abundant in the thorn-veld of the southern part of the Province, extending also through Natal; in the northern part of the Province it is present, but less abundant, and it occurs widely distributed through Tropical Africa. Timber very hard and dark, but too small to be of other use than fuel. Bark very rough, dark grey, deeply fissured, and more or less netted in deep ridges; foliage deep green.

PLATE XXXVIII. A. 1, Branch; 2, Cluster of pods; 3, Flower spike; 4, One pod; 5, Tree, general habit (much reduced); 6, Seed.



**D. major.** (New species.) *Vern. name*—4, Tanga. A tree 3-6 metres high, with rather a flat crown. Branches set with stout single axillary leaf-bearing spines 3-5 c.m. long; leaves 15 c.m. long, 7 e.m. wide; rachis pubescent, with a gland at each pair of pinnæ; pinnæ about 6 pair, 4-5 c.m. long, leaflets 10-12 pairs, oblong, 7-10 m.m. long, 2-3 m.m. wide. Stipules pubescent, very caducous. Spike fertile at the top only. Pods numerous, much twisted, 8-10 c.m. long, 1-5 c.m. wide, flat. Frequent in the thorn-veld of Lourenço Marques and Maputa up to the Lebombos. Sim 6248.

PLATE XXXVI. A. 1, Leafless branch, with spines; 2, Leaf; 3, Spike, after flowering; 4, Fruit fascicle; 5, Stipule,  $\times 2$ .

[“Index Kewensis” also retains *D. Forbesii*, Benth. and *D. Kirkii*, Benth. (in Trans. Linn. Soc. XXX., 1875, 383), as Tropical African. The former is said in Fl. Trop. Afr. to be from Delagoa Bay and to be “nearly allied to *D. nutans*, differing in the fewer pinnæ of the leaves and one or two other characters of doubtful constancy,” while of the latter I have no information.]

124. **ACACIA.** Trees, shrubs or climbers, usually prickly or spine-bearing, having bi-pinnate leaves and clusters or spikes of small yellow, often polygamous flowers, either axillary or arranged in terminal panicles. Calyx-tube very short, or sepals free. Petals 5 or fewer, more or less connate. Stamens numerous, free. Ovary several or many-ovuled. Pod compressed or flat, dehiscent or indehiscent. A vast genus, present in most warm countries, but most numerous represented in species in Africa and Australia. The bark and pods of many species are rich in tannin; others yield gums, while from various species valuable firewood and timber are obtained. The Australian “Black Wattle” (a *decurrens*) is now largely cultivated in Cape Colony and Natal for its bark and timber. In several Australian species the pinnæ and leaflets are suppressed, and the main rachis modified into a leaf-like phyllode.

**A. albida**, Delile. *Vern. names*—4, Newapf, and Bolela. A large tree, 15-25 metres high and with stem up to 60 c.m. diameter. Spines in pairs, stipular, straight, stout below, 1-3 c.m. long. Foliage and bark light grey, leaves 7 c.m. long, pinnæ 4-5 pairs, leaflets 8-12 pairs; leaflets oblong, 5 m.m. long, 1-5 m.m. wide, ultimately glabrous. Inflorescence spicate; spikes 7 c.m. long, axillary, single, or 2 together on short branchlet; flowers very light yellow or nearly white. Petals free nearly to the base, much longer than the calyx. Pods 10-12 e.m. long, 2-5 e.m. wide, flat but much twisted and bent, mucronate at the rounded apex; base oblique; peduncle 1-2 e.m. long. Bark light grey, woody or corky, with a general smooth appearance; timber grey, light, coarse-grained, fit for fuel only, and not good for that. Seedlings canescent or light grey puberulous, very much branched horizontally, and set with stipular straight sharp prickles 1-2 c.m. long. Frequent at Umbelusi and throughout the alluvial deposits in the thorn-veld south of the Limpopo (extra-tropical); less common in Zambesia.

PLATE XXXIV. 1, Branch; 2, Pods; 3, Spike; 4, Flower,  $\times 5$ ; 6, Tree, general aspect (much reduced).

Prof. Oliver (Fl. Trop. Afr.) doubtfully refers to this the *A. mossambicensis* of Bolle (Peters’ Mossamb. Bot. 1-5) with the remark—“I do not observe any character in the published description by which it differs, excepting in the absence of spines. This however occurs occasionally in *A. albida*.”

**A. nigrescens**, Oliv. *Vern. names*—3, Knopjesdoorn; 4, Mkaia. A glabrous tree 6-15 metres high, with straight stem 20-30 c.m. diameter; thorns in pairs, stipular, 10-12 m.m. long, hooked, always present, growing with age into knobs 3 c.m. deep, each with the sharp hooked thorn on top. Leaves glaucous, 5-8 c.m. long; rachis with one gland near the base; pinnæ usually 3 pairs; leaflets 1 pair on each, 1-5-2 c.m. long, 1 c.m. wide, very oblique (or on coppice shoots 2-5 c.m. long and wide and less oblique). Inflorescence spicate. Spikes 5-8 c.m. long, axillary, or 3-4 together on special short branches. Flowers numerous, light yellow. Pod 7-10 c.m. long, 2 c.m. wide, flat, with 1 c.m. point; seed 1-5 c.m. wide, flat. This differs from the western *A. detinens*, which is very similar in foliage, in its spicate inflorescence. This tree covers large stretches of country in Maputa, Lourenço Marques, Marracuene, and part of Gaza, usually as almost pure open forest with bare stems and grass underneath, forming splendid cover and grazing for game and stock. The tree is the most valuable forestal asset in the southern part of the Province, having a valuable durable dark hardwood which has been in demand for Transvaal mining purposes since the railway was opened through; on this account the tree has been almost cut out in so far as it is easily obtainable near the main line of railway, but a very large quantity still remains along the Swaziland railway and in the back country, which may assist to get development lines put down there at some future time. Meantime the Government has issued a proclamation prohibiting the felling of this kind for the present; a wise step until it is in a position to collect license fees, or royalty, upon the timber so used.

The tree must have an unusual power of withstanding fire, for the grass is burned through the whole district every year, and I presume this burning is the cause why other species are not present. It seems to do best upon flat dry alluvial plains, and is absent from moist spots or river-sides. A variety has been separated under the name *A. nigrescens*, var. *pallens*, Benth., and has since been raised to specific rank, as *A. pallens*, Rolfe; what its distinguishing characters are I have not learned, but Mr. J.

<sup>1</sup>*Dichrostachys major*. (Sp. nov.) Arbor 3-6 m. alta, ramis ramulis validis acutis folia gerentibus 3-5 c.m. longis in axillis foliorum armatis; foliis 15 c.m. longis, 7 c.m. latis; rachi pubescente, ad bases pinnarum glandula praedita; pinnis circiter 6-jugis, oppositis, 4-6 c.m. longis; foliolis 10-12 jugis, oblongis, 7-10 m.m. longis, 2-3 m.m. latis; stipulis pubescentibus caducis; inflorescentia spica, apicem versus ferili; leguminibus multis, contortis, 8-10 c.m. longis, 1-5 c.m. latis, planis. Frequens in dumetis aculeatis, Lourenço Marques et Maputa ad Lebombos. Sim 6248. Tab. XXXVI. A.

Burt-Davy, in his "Notes on Some Transvaal Trees and Shrubs,"<sup>1</sup> says:—"Acacia pallens, Rolfe (*A. nigrescens* var. *pallens*, Benth.) The type specimens, both of *A. nigrescens* and of var. *pallens*, are from Zambesia, and in each case they are very incomplete. Additional material from the Transvaal enables Rolfe to separate the latter as a distinct species to which all our material so far collected appears to belong. I have incomplete winter specimens from Tlopi, Bechuanaland, which may belong to *A. nigrescens*, but it is impossible to say definitely until foliage has been collected from the same locality. This is one of our most important timber trees, and is largely cut for mine-props under the name Knopjes-doorn or um-kai. The prickles persist for many years on the main trunk, and branches, effectually arming the tree, though to what advantage is not evident. The type of 'var. *pallens*' is from opposite Pita, near Senna, Zambesia, April, 1860, Kirk, 201, a tree 30 feet, very hard heavy wood, used for clubs." I did not find this species in Zambesia, but may not have been far enough up-country for it, and in the thorn-veld of the south I saw only one form, except in so far as differences occur through vigorous or poor growth, coppice shoots, &c.

PLATE XXXIII. B. 1, Branch; 2, Pinna of Coppice shoot; 3, Pod; 4, Thorn; 5, Seed.

**A. Welwitschii**, Oliv. *Vern. names*—3, Aapjesdoorn; 4, Mkaia. A glabrous tree 5-10 metres high, 20-30 c.m. diameter of stem. Thorns in pairs, apparently stipular, always present, 1-1.5 c.m. long, hooked, stout. Leaves 7-8 c.m. long; pinnæ 3-4 pairs; leaflets 5-7 pairs, lax, 7 m.m. long, 4 m.m. wide, elliptical; rachis with a gland below the lowest pinnæ. Inflorescence spicate; spike 5 c.m. long, axillary, or paniced at the end of a branch. Pod 10-12 c.m. long, 2 c.m. wide, rounded at the base, rounded and bluntly pointed at the apex, nearly flat, about 6-seeded, very shortly stalked. Seeds oblong, 1 c.m. long. Frequent in the thorn-veld, mixed with *A. nigrescens*, and enjoying the same native name and reputation for its timber, which also is used in mining. About Machava the tree seems more vigorous than further inland, and has frequently up to 7 pairs of pinnæ. It is recorded from Zambesi, below Tete, but I did not find it in the lower Zambesi districts.

Miss Gibbs, in recording it from Victoria Falls, where it is the only *Acacia* mentioned by her, says:—"Large tree, with flat crown. Flowers pink, with pink rachis to raceme." Although hardly in flower during my visit I believe the flowers to be yellow.

PLATE XXXVII. B. 1, Fruiting branch; 2, Spike; 3, Tree, general aspect (much reduced).

**A. glaucophylla**, Steud. *Vern. name*—10, Egamosena, which name is used for several thorny *Acacias*. A large tree in the forests of Magenja da Costa, without branches below. Younger parts finely pubescent, older parts glabrous. Spines in pairs, apparently stipular, 5 m.m. long, recurved. Leaves with about 6 pairs of pinnæ, each with about 12-16 pairs of leaflets. Leaflets about 1 c.m. long, 2 m.m. wide, very oblique at the base, and with the vein near the upper margin. Inflorescence spicate; spikes axillary, 4-5 c.m. long. Pods variable in outline, usually 10-12 c.m. long, 2-2.5 c.m. wide, rounded and suddenly pointed, sometimes more narrow or with a waved margin, about 6-seeded, flat, coriaceous, reticulated, glabrous when mature. Seeds 1 c.m. wide, nearly circular, compressed.

PLATE XL. B. 1, Fruiting branch; 2, Pinnule,  $\times 4$ .

**A. purpurea**, Bolle in Peters' Mossamb. Bot., 1, 6. Unknown to me, but described as "a small tree from Zambesia, with green-grey tomentose, or thickly pubescent extremities. Leaf-rachis pubescent, with concave sessile glands between the pinnæ, which are in 8 pairs; leaflets 12 jugate, very shortly petiolulate, oblong, obtuse, thinly pilose, 3 lines long, 1½ lines broad. Spikes equalling the leaves, dense, pilose. Flowers purple. Calyx hairy, with finely pointed teeth. Petals free nearly to the base. Legume not seen. I do not know this plant, nor have I identified it among Dr. Kirk's collections. Dr. Bolle puts it in Mr. Benthams section *Vulgares-Diacanthæ*."<sup>2</sup>

**A. rostrata**. (New species.)<sup>3</sup> *Vern. names*—3, Aapjesdoorn; 4, Mkaia. Usually a much-branched shrub 2-4 metres high; occasionally a tree of considerable size. Two hooked thorns 5-10 m.m. long, apparently stipular, tend upward; 1 larger thorn up to 1.5 c.m. long, somewhat hooked, tends downward below the bud. This is consequently one of the worst *Acacias* for detaining passengers, as upward and downward thorns both catch. Leaves 7-10 c.m. long; the rachis pubescent, with 2 or more glands toward the base; pinnæ about 7 pairs; leaflets about 14 pairs, 4-7 m.m. long, 1.5 m.m. wide. Inflorescence spicate. Spike 5 c.m. long. Pod 7-10 c.m. long, 2-2.5 c.m. wide, the middle part oblong, tapering to the narrow base, and also tapering to the 1-2 c.m. beak, flat, with thin reticulated valves and 1-5 seeds. Frequent in the thorn-veld of Lourenço Marques and Maputa, usually in moist depressions; when large used along with other kinds known as Mkaia and not distinguishable in its timber from them. Sim 6263.

PLATE XXXVII. A. 1, Fruiting branch; 2, Spike; 3, Tree, general aspect (much reduced).

<sup>1</sup> Kew Bulletin No. 4, 1908, page 159. <sup>2</sup> Prof. Oliver in "Flora of Tropical Africa," II., 343.

<sup>3</sup> *Acacia rostrata*. (Sp. nov.) Frutex ramosus, 2-4 m. altus, nonnunquam arbor magna, stipulis hamatis acutis, altero 5-10 m.m. longo sursum flexo, altero majore 1.5 c.m. longo deflexo aculeata; foliis 7-10 c.m. longis; rachis pubescente glandulis 2 vel pluribus basin versus prædita; pinnis circiter 7-jugis, foliolis circiter 14-jugis, 4-7 m.m. longis, 1.5 m.m. latis; inflorescentia spica 5 c.m. longa; legumine 7-10 c.m. longo, 2-2.5 c.m. lato, plano, reticulato, media parte oblonga, 1-5-spermo. Frequens in dumetis aculeatis, plerumque humidis, Lourenço Marques et Maputa. Sim 6263. Tab. XXXVII. A.



**A. Catechu**, Willd. *Vern. names*—10, Moroga and Nematonga. A large or medium-sized tree, having short, stout, recurved thorns usually present in pairs. Leaves 12-18 c.m. long, the rachis somewhat pubescent, with a sessile gland near the base and several between the pinnæ; pinnæ many; leaflets many, smaller than those of *A. caffra*. Inflorescence spicate; spikes axillary, 5-10 c.m. long, petals much longer than the calyx. Pod flat, linear, about 6-seeded, 10 c.m. long, 2 c.m. wide. Zambesia, scarce. Mr. Burt-Davy, speaking of this species in the Transvaal says:—"Our largest species of *Acacia*, forming a handsome and striking tree on the river banks of the eastern middle veld, between 2000 and 2500 ft. alt. . . . called 'White Thorn' . . . tall trees with trunks up to 1½ and 2 ft. diam."

**A. caffra**, Willd., var. *rupestris*. (New variety.)<sup>1</sup> *Vern. names*—4, 13, Tolc; 15, Mutholwane. Small tree with leaf 15 c.m. long; about 14 pairs of pinnæ; about 30 pairs of leaflets to each; rachis with gland near base and between one or more of the upper pairs. Stem somewhat angular, with recurved prickles 3-7 m.m. long, scattered on its surface. Inflorescence spicate. Spike 7-10 c.m. long, seldom paniced. Pod 10-12 c.m. long, 1½ c.m. wide, pointed, tapering to both ends, flat. The whole tree pubescent. Probably corresponds with *A. eriadenia*, Benth., but is not specifically distinct from *A. caffra*. The type of *A. caffra* was not noticed in the Province; it is a larger tree, usually near water, less pubescent and more paniced. The present form is frequent on and below the Lebombos, in Maputa and Marracuene, less common nearer Lourenço Marques, and not seen in other districts. It occurs in the Transvaal, Natal and Cape Colony. Sim. 6235.

PLATE XXXIX. B. 1, Leaf and spike; 2, Pod.

**A. Burkei**, Benth. Unknown to me; described by Harvey, as:—"Young twigs and petioles patently hispid; prickles in pairs just below the nodes, recurved; petiole unarmed or armed, and with a petiolar gland below the pairs; pinnæ 3-6 jugate; leaflets 5-8 jugate, obliquely oblong or obovate, obtuse or mucronulate, the younger villous at the margin; spikes tufted, loose, peduncled, rather longer than the leaf. Legume? Bark dark ashey-brown, rugged. Leaflets drying pale, 4 lines long, 1½-2 lines wide, the uppermost largest and obovate. Spikes 2-3 inches long."<sup>2</sup>

Mr. Burt-Davy, who calls this *Aapjies-doorn* cites, along with Transvaal localities, "Manganja hills, Zambesia, fine tree, 30-40 feet high; wood not hard, but tenacious, used by natives for hoe handles, &c., Meller 9 in Herb Kew."

**A. delagoensis**, Harms. Concerning this species I know nothing beyond Mr. Burt-Davy's record,<sup>3</sup> viz.:—"Umbolosi, Schlechter, 11,718, in Herb Lurich. Probably extends into the low veld of the Transvaal, apparently near to *A. Burkei*."

**A. lasiopetala**, Oliv. Unknown to me, described by Prof. Oliver as:—"Extremities uniformly softly hoary-tomentose. Stipular spines, straight or subrecurved, pubescent nearly to the apex. Young leaves, especially on the rachis, silky tomentose; pinnæ in 14-22 pairs; leaflets 20-30 pairs, probably often more numerous, not wholly developed in our specimens; gland sessile near the base of the rachis. Peduncles in pairs or solitary from the lower axils, pubescent, 1-2 inches long. Bracts obsolete. Flowers capitate. Calyx pilose pubescent, lobes ovate obtuse. Petals externally silky, cohering ½ or ⅔ their length, about half as long again as the calyx. Ovary subsessile, glabrous, subtruncate above, with an obliquely inserted filiform style. Fruit unknown. Foot of Impemba Peak, Shire River, Dr. Kirk."<sup>4</sup> Mr. Burt-Davy, who has compared Transvaal specimens with those from the Zambesi (Buchanan's), says:—"In foliage and pubescence it is much like *A. Rehmanniana*, Schinz, but the legumes are large and woody, in shape a little approaching those of *A. hebeclada*, but longer, glabrous and shining. The bark is quite different from that of *A. Rehmanniana*, being pale yellow, soft and papery, at length flaking off."

**A. pennata**, Willd. *Vern. name*—4, Inekwa. Scandent by nature, erect when support is absent. Prickles scattered round the stem and between the nodes, often numerous, not stipular, recurved, 1 c.m. long. Leaf 12-18 c.m. long; the rachis often bearing prickles on its lower surface, and a gland on its upper; pinnæ 10-15 pairs, or not regularly opposite, leaflets 15-30 pairs, 7 m.m. long, 2 m.m. wide. Inflorescence capitate in axillary and terminal panicles. Axillary abortive branches set with numerous small recurved prickles, and with tendril nature assist the scandent habit, but where there is no support the plant assumes erect habit 4-10 feet high, much branched, and with the inflorescence in lax terminal panicles, with numerous capitate heads and eventually 30 or more pods in a panicle. Pod 10-15 c.m. long, 2-2½ c.m. wide, thinly coriaceous, flat, many-seeded. Seeds oblong, 7 m.m. long, dark brown. A bad forest weed. Umbalusi; Lourenço Marques, &c.

PLATE XXXVIII. B.

<sup>1</sup> *Acacia caffra*, Willd., var. *rupestris*. (Var. nov.) Arbor parva pubescens; cauli paullo angulato aculeis recurvis 3-7 m.m. longis sparsis armato; foliis 15 c.m. longis, pinnis circiter 14-jugis, foliolis circiter 30-jugis; rachi glandula prope basin cacterisque paucis inter pinnas prædita; inflorescentia spica 7-10 c.m. longa, raro paniculata; legumine 10-12 c.m. longo, 1½ c.m. lato, aculo, plano. Frequens in Maputa et Marracuene, minus frequens versus Lourenço Marques. Verisimiliter *A. eriadenia* Benth. Sim. 6235. Tab. XXXIX. B.

<sup>2</sup> "Flora of Tropical Africa," II., 282. <sup>3</sup> Kew Bulletin No. 4, 1908, 157. <sup>4</sup> "Flora of Tropical Africa," II., 347.



**A. retinens.** (New species.)<sup>1</sup> *Vern. names*—4, Insibebe or behe; 15, Mshakwe. A shrub 2-3 metres high, or occasionally a small tree, gregarious to the exclusion of other kinds. Stipular spines 5-10 m.m. long, strong, sharply hooked, often altered by insect parasites into hard swollen spines 3-4 c.m. long, 1 c.m. diameter with the points sharp and hooked. Leaves 2.5-4 c.m. long, with 5-7 pairs of pinnae, each with 12-14 leaflets which are 2 m.m. long, linear, pubescent and ciliate. All young parts densely pubescent, including spines, twigs and pods; with age these become nearly glabrous. Inflorescence nearly capitate on 2-3 c.m. peduncles bracted below the middle. Pod 2.5-4 c.m. long, 1 c.m. wide, straight, flat, dehiscent, with about 4 compressed brown seeds with a cordate spot bordered white on each. Umbelusi and Lehombo (extra-tropical). A most adherent "Wacht-em-bitje" said by Mr. Stem to be highly valuable for the rough cordage from the bark, which is too dear for commerce but for durability is not excelled. The curious gall-spines are constantly present and are a curious development; galls of the same nature also occur occasionally on *A. horrida*, and more regularly on the exotic *A. cornigera*. Sim. 6391.

PLATE XL. A.

**A. arabica**, Willd. *Vern. names*—4, Tchanga or Chenga; 6, Shangaira and Chical; 15, Isitwete; 10, Mungu-m-chen and E. gamo-sena. In this Province a flat-topped tree 3-6 metres high with a rugged black stem, and usually well supplied with straight white stipular spines 5 m.m. to 7 c.m. long, the larger spines up to 7 m.m. diameter at base. Leaves 7-10 c.m. long; pinnae 6-8 pairs; rachis pubescent; leaflets 10-12 pairs, 6 m.m. long, 2 m.m. wide, linear-oblong. Peduncles clustered, axillary, 3-7 c.m. long, bracted rather below the middle, with capitate or sub-spicate inflorescence and often a few flowers at the bracts; occasionally spicate and capitate inflorescences occur on the same branch. Pod 15 c.m. long, 1 c.m. wide, stipitate, straight, moniliform, glabrous or pubescent. The type of this species belongs to North Africa; the South African form is var. *Kraussiana* characterised by long spines and deeply crenate but scarcely moniliform, tomentose pods. Seldom gregarious, but more generally distributed throughout the Province, as also throughout tropical and sub-tropical Africa than any other species. Abundant in Maputa and Natal; seldom of timber size, but it makes first-rate fuel. "On the Upper Nile this species attains a large size, the trunk measuring 8 or 10 feet in girth. The wood is used in boat-building, and the astringent pods are largely used in tanning." From some of the forms of this tree the gum arabic of commerce is obtained. The pod is known as, 10, Messieo or Issaeii or Ensio.

PLATE XXXVI. 1, Branch, showing spines; 2, Pod; 3, Seed; 4, Tree, (much reduced); 5, Flowering branch

**A. horrida**, Willd. *Vern. names*—1, Thorn-tree, Mimosa; 4, Mungu; 13, Umnga; 14, Doornboom (Cape Colony); Zoet-doom (Transvaal). A glabrous flat-topped tree usually spreading more than its height. Pinnae 2-4 pairs, leaflets 8-12 pairs, linear-oblong. Inflorescence capitate; peduncles many together in axillary clusters, or by the absence of leaves forming terminal panicles, bracteate below the middle; flowers bright yellow, sweet scented. Pods 5-12 c.m. long, 6-12 m.m. wide, straight, falcate, or more or less twisted, thinly coriaceous, glabrous, dehiscent, acute, many-seeded, compressed, not or hardly constricted between the seeds. Spines in pairs, stipular, straight, acute, from 1-12 c.m. long, white. This is the most common species in Cape Colony, Natal, and Transvaal, but is less common in this Province, and in the low tropical districts absent. For illustration and uses see "Forest Flora of Cape Colony," p. 211, Plate LXI.

Var. *transvaalensis*, Davy, differs in being pubescent on its younger parts.

**A. seyal**, Delile. A small tree 3-5 metres high, usually growing in straggling fashion in dense impenetrable masses, and occupying more or less wet ground. Spines 2-5 c.m. long, slender, white; leaves 5 c.m. long; pinnae 3-4; leaflets 8-20, 5-7 m.m. long, 2 m.m. wide or less; peduncles axillary, several from an axil, 2-5 c.m. long; flowers capitate; pods 8-12 c.m. long, 6 m.m. wide, much constricted between the seeds; valves thinly coriaceous. Too near *A. horrida*, from which the more constricted pods form the best distinction, and still with a considerable indescribable difference which any native can recognise. Frequent in Maputa and Marraquene.

PLATE XXXV. B. 1, Fruiting branch; 2, Flower-head; Flower,  $\times 3$ .

**A. natalitia**, E. Mey. Concerning this species which Mr. Burt-Davy collected on the Komati River, he says:—"Nearly related to *A. horrida*, but apparently a valid species, distinguished by the much narrower leaflets and characteristically pale bark, as compared with the dark-brown, almost black, bark of *A. horrida*."

**A. hirtella**, E. Mey. *Vern. names*—4, Mungu-manzi; 10, Egamosena. A very robust tree, densely pubescent on the younger parts, with heavy dark-green foliage. Spines in pairs, apparently stipular, 1-5 c.m. long; pinnae about 5 pairs; leaflets 10-15 pairs, 5-7 m.m. long, 2 m.m. wide. Inflorescence capitate, peduncles several

<sup>1</sup> *Acacia retinens*. (Sp. nov.) Frutex 2-3 m. altus, vel arbor parva, densissime gregaria, armata stipulis spinosis 5-10 m.m. longis validis hamatis, vel saepe in gallas insectorum 3-4 c.m. longas 1 c.m. diam., apicem versus hamatas mutatis; foliis 2.5-4 c.m. longis, pinnis 5-7-jugis, foliolis 12-14-jugis 2 m.m. longis, linearibus, pubescentibus ciliatis; partibus junioribus (ramulis, spinis, fructibus inclusis) pubescentia densa vestitis, demum subglabris; inflorescentia sub-capitata; pedunculo 2-3 c.m. longo, infra medium bracteato; legumine 2.5-4 c.m. longo, 1 c.m. lato, recto, plano, circiter 4-septimo, dehiscente, seminibus fuscis compressis, macula cordata albomarginata notatis. Umbelusi et Lebombo. Sim 6391.

from one axil, 2.5 c.m. long; bracted below the middle. Pod somewhat falcate, 10-15 c.m. long, 1.5 c.m. wide, 5-6 m.m. diameter, with convex leathery valves and 6-9 seeds, which hang out after the pod opens. Pod tapering to the base, roundly pointed at the apex. This tree agrees with Harvey's description ("Flora Capensis," II., 281), but *A. hirtella* of my "Forests and Forest Flora of Cape Colony" is different, and is probably a still unnamed species, which was not seen in Portuguese territory. The present species is abundant in Lourenço Marques, Maputa and Marraquene, and it also occurs throughout the districts (tropical and extra-tropical) explored by me, often as a fringe just above the mangroves on saline mud flats. Along with other *thorny* species it shares the name Mungu-m-chen (*i.e.*, prickly-thorn).

PLATE XXXV. A. 1, Flowering branch; 2, Pod, open; 3, Section of Pod.

**A. Xanthophloea**, Benth. *Vern. names*—1, Fever-tree; 4, Kamba, Camba, Shi-kamba, and Mhlanga. Lofty tree, up to 30 metres high, with stem to 1 metre diameter; growth mostly on top, and on a few scattered branches. Stipular spines usually present, in pairs, 1-4 c.m. long, slender, straight, acute, white. Bark of the stem glaucous green, smooth. Leaves 5-15 c.m. long, 4 c.m. wide or less, 2-pinnate; rachis variable from terete to sulcate, and usually with one oblong gland near the base; pinnae 4-7 pairs, leaflets 10-15 pairs, 6 m.m. long; the leaves and young growth at first scaly-pubescent, but soon almost glabrous. Inflorescence capitate, heads globose; peduncles 3 c.m. long, 3-bracted near the middle; many from 1 axil, the peduncles and small leaves produced on abortive axillary branchlets. Specimens frequently occur where (by fungoid fasciation?) the inflorescence becomes abnormal, produced into a scattered raceme 5.7 c.m. long, or paniculate through the production of secondary racemes from the axils of the bracts. Pods numerous from 1 flower, not seen at maturity. Several writers have commented on this tree not bearing fruit. I think it probably ripens rapidly and falls without being woody, as I saw no trace of old fruit, though flowers and young fruits were abundant. A stately tree with a ghastly hue on the stem, growing usually on flat clay soils, hence often co-present with malarial fever, and known as fever tree. The timber seems sound when cut, but soon cracks badly and decays, and is useless for most technical purposes, and subject to insect-boring almost as soon as cut. Frequent at Umbelusi, Matolla, &c., and seen at Chai-chai, Manjikesi (scarce and only near the pans), Mutambe, Inhambane (extra-tropical), Quelimane and Nhamacurra, but not in large quantity altogether. Occurs also in the Transvaal low veld, Rhodesia, and further north, and in Northern Nigeria. "The bark of the main trunk and branches exfoliates leaving a layer of new bark of yellow colour and powdery surface, as though covered with a lichenoid growth." Said to produce gum, but this is not a noticeable feature.

PLATE XLI. 1, Flowering branch, with normal inflorescence; 2, Glandon petiole; 3, Abnormal inflorescence; 4, Young pods; 5, Tree, general appearance (much reduced).

Several other species of *Acacia* are on record, unknown to me and concerning which my information is insufficient. Among these are:—

**A. Petersiana**, Bolle in Peters' Mossamb. Bot. I. 4, concerning which Prof. Oliver, in "Flora of Tropical Africa," states that so far as he can judge it "must be very near *A. spirocarpa*. The fruit however is unknown. The leaves are described as hairy, not exceeding one inch in length, with 10 pairs of pinnae, leaflets very small, linear, in 6-20 pairs. The involucre is inserted in the lower part of the peduncle." But Burt-Davy (Kew Bulletin No. 4, 1908, p. 160) doubts if *A. spirocarpa*, Hochst., occurs so far south as the Transvaal, and refers his Transvaal specimens to *A. spirocarpoides*, Engl., of which I have no description. *A. spirocarpa* is characterised by exceedingly twisted pubescent pods and capitate inflorescence.

**A. Rovumæ**, Oliv., with spicate inflorescence, from Rovuma Bay. See "Flora of Tropical Africa," II. 353.

**A. species**, with spicate inflorescence, from Manganya Hills, Zambesi-land. See "Flora of Tropical Africa," II. 353.

**A. sambesiaca**, Schinz, mentioned by Mr. Burt-Davy in Kew Bulletin No. 4, 1908, p. 159.

125. **ALBIZZIA**. Flowers mostly hermaphrodite; inflorescence in capitate heads on peduncles axillary on special short branches or on terminal branches. Calyx tubular, 5-toothed; teeth equal. Corolla tubular, with a half-spreading limb of 5 equal lobes; stamens indefinite, 15-30, more or less connate round the pistil in hermaphrodite flowers. Central flowers sometimes different, with short staminal sheath. Legume dry, dehiscent or indehiscent, several-seeded. Leaves bi-pinnate. Trees or shrubs with or without spinous branches.

**A. Forbesii**, Benth. A spreading tree, 3-7 metres high, much branched, bushy or flat. Twigs rigid; stipules 6 m.m. long, lanceolate; inflorescence axillary on the young shoots. Leaves 5-7 c.m. long and wide; pinnae 2-4 pairs, leaflets 7-12 pairs, at first obliquely oblong, 7 x 2 m.m., afterwards linear through revolute margins; the main vein parallel to and near the upper margin. Rachis with a gland below the lower pair and between the upper pair of pinnae; rachis, veins and margins of

<sup>1</sup> Burt-Davy in Kew Bulletin No. 4, 1908.

young leaves pubescent, as also the peduncles which are 2-4 c.m. long, and many-flowered. Petals united  $\frac{1}{3}$  their length. Staminal tube nearly as long as the petals. Pod 8-15 c.m. long, 3-4 c.m. wide, flat, thin, dry, membranous, indehiscent, transversely streaked, with many hard brown seeds in separate sections, each seed with a scar on each side near the base. Abundant near Lourenço Marques, seldom if ever of timber size. See "Flora Capensis" (Harv. & Sand.) II. 284.

PLATE XXXIX. A. 1, Flowering branch; 2, Fruiting branch; 3, Leaflet,  $\times 3$ ; 4, Flower,  $\times 2$ ; 5, Corolla, opened out,  $\times 3$ ; 6, Pistil,  $\times 2$ ; 7, Anther,  $\times 4$ ; 8, Seed; 9, Staminal column and stamens; 10, Tree, general aspect.

**A. umbalusiana.** (New species.)<sup>1</sup> *Vern. names*—4, 15, Nala-nyaca, or Nala. Shrub 2-4 metres high, nearly or quite deciduous, with numerous sharp spines 5-10 c.m. long, bearing leaves and peduncles; or sometimes a bushy tree 7-10 metres high with fewer spines. Stipules 3 m.m. long, hardly prickly. Leaves 5-8 c.m. long and wide, rachis with a gland near the base, pinnæ 2-3 pairs, leaflets 2-5 pairs 7-10 m.m. long or gradually larger upward to 2 c.m. long, obliquely elliptical or more or less trapeziform, rounded or somewhat pointed. Peduncles 1.5-3 c.m. long, 6-12 flowered; pedicels 3-5 m.m. long; calyx 2 m.m. long; corolla 5 m.m. long, divided at the top only; staminal tube included; filaments 1.5-2 c.m. long, pods 8-12 c.m. long 1.5-2 c.m. wide, rounded to a point, tapering somewhat at the base, thin, flat, 3-5 seeded, dehiscent. Seeds round, compressed, 7 m.m. wide. Bark smooth. Roots used for stomach medicine. Frequent in Lourenço Marques and Maputa districts in the thorn-veld and up to the Lebombos. Sim 6200.

PLATE LV. A. 1, Flowering branch; 2, Pods; 3, Flower,  $\times 2$ ; 4, Staminal tube and stamens; 5, Anther; 6, Pistil,  $\times 2$ ; 7, Upper leaflets (occasional size).

**A. mossambicensis.** (New species.)<sup>2</sup> *Vern. name*—4, Impesha. A large tree 12-20 metres high, and 60-100 c.m. diameter of stem with useless timber and rough bark used as ashes with snuff. Leaves 2-pinnate, rachis 15 c.m. long pubescent, with a sessile gland near the base; pinnæ 3 pairs 7-10 c.m. long, each with rachis swollen at the base; leaflets 3-4 pairs, the upper the larger, 3-5 c.m. long, obliquely elliptical, ovate or obovate, usually rounded or bluntly pointed at the apex, tapering to the 2-3 m.m. petiole on the lower side but parallel with the rachis or nearly so on the upper side, and finely tomentose on the lower surface, but soon glabrescent on the upper. Peduncles axillary, with 10-15 sessile flowers on top. Calyx tubular, 4 m.m. long, with short equal teeth; corolla longer by half, with short lobes; peduncle, calyx and corolla densely pubescent; staminal tube included, filaments 2 c.m. long. Pods 12-18 c.m. long, 2-3 c.m. wide, shortly pointed, rounded at the base to the 1-1.5 c.m. stipe, flat, membranaceous, 8-10 seeded, and with a distinct margin on each side. Frequent throughout the Province, semi-deciduous, flowering in early summer. Sim 6392.

PLATE LX. 1, Leaf; 2, Pods; 3, Inflorescence.

Between Arenga and Bajou, Magenja da Costa were trees leafless when seen, and with red pods, and known locally as gamaranga or Mukratabo, which appear to belong to this species but may be a different closely allied one.

**A. fastigiata,** E. Mey. *Vern. names*—1, Flatcrown; 4, Goâne; 5, M-bezwa; 6, Mo-esu, or O-heso; 10, Maranga; 13, Umhlandhloti and Nebelele. A tree 7-20 metres high, 30-60 c.m. diameter of stem, having a clear bole and widely expanded, flat crown 12-15 metres diameter. Leaves usually deciduous, and the white twigs are conspicuous during winter. Leaves alternate, bi-pinnate, 15-25 c.m. long, 15 c.m. wide; rachis up to 15 c.m. long with a sessile gland near the base; pinnæ 5-6 pairs, leaflets 6-12 pairs, each leaflet 12-18 m.m. long, 6 m.m. wide; upper pair rather smallest. Heads corymbose toward the end of the branch, axillary with or without produced leaves, 2-10 in an axil, 3-4 c.m. wide, with 50 or more flowers, each flower subtended by an acute involute rusty bract; the flowers subsessile, and mostly hermaphrodite, but 1 or more are staminate in each head. In the hermaphrodite flowers the stamens are indefinite (15-30), the filaments united for about 3 c.m. and free and sub-erect for 1 c.m., while the slender pistil extends 1 c.m. beyond the top of the staminal tube. In the ventral staminate flower or flowers the pistil is absent, the 10-toothed calyx is larger, the corolla shorter, the staminal tube wide and full of nectar, and shorter than the corolla which is hid by

<sup>1</sup> *Albizzia umbalusiana*. (Sp. nov.) Frutex 2-4 m. altus, caule laevi, ramis multis foliiferis et floriferis acutis armatus, vel arbor fruticosa 7-10 m. alta, spinis paucioribus armata; foliis omnino vel paene deciduis, 5-8 c.m. longis et latis, rachi basin versus glandula praedita; pinnis 2-3-jugis; foliolis 2-5-jugis, 7-10 m.m. vel 2 c.m. longis, oblique ellipticis, vel plus minus trapeziformibus, sorsum latioribus, obtusis vel subacutis; pedunculis 1.5-3 c.m. longis, flores 5-12 gerentibus; pedicellis 3-5 m.m. longis; calyce 2 m.m. longo; corollae 5 m.m. longae lobis brevibus; tubo staminali incluso, filamentis 1.5-2 c.m. longis; leguminibus 8-12 c.m. longis, 1.5-2 c.m. latis, apicem versus rotundatis, submucronatis, tenuibus, planis, 3-5-spermis, dehiscentibus; seminibus rotundis compressis, 7 m.m. latis. Frequens in dumetis aculeatis; Lourenço Marques, Maputa, Lebombos. Sim 6200. Tab. LV. A.

<sup>2</sup> *A. mossambicensis*. (Sp. nov.) Arbor magna, 12-20 m. alta, subdecidua, caule 60-100 c.m. diam.; foliis duplopinnatis; rachi 15 c.m. longa, pubescente, glandula sessili basilari praedita; pinnis 3-jugis, 7-10 c.m. longis, costa basin versus tumefacta; foliolis 3-4-jugis, superioribus majoribus, 3-5 c.m. longis, oblique ellipticis, ovatis, vel obovatis, apice rotundata vel subacuta, omnibus versus stipitem 2-3 m.m. longum angustatis; pagina inferiore tomento tenui vestita, superiore mox glabrescente; inflorescentia axillari, floribus 10-15 sessilibus ex apice pedunculi ortis; pedunculo calyce et corolla pubescentia densa vestitis; calycis tubo 4 m.m. longo, in dentes aequos breves producto; corolla calyce dimidio longiore, petalis brevibus tubo staminali incluso, filamentis 2 c.m. longis; leguminibus 12-18 c.m. longis, 2-3 c.m. latis, breviter mucronatis, basi rotundatis, versus stipitem 1-1.5 longum planis, membranaceis, 8-10 spermis, marginibus manifestis. Frequens per provinciam. Sim 6392. Tab. LX.



the deflexed and more numerous filaments. Stipules caducous, on flowering parts conspicuous, 1 c.m. long, pubescent. Pod straight, flat, reticulate, 12-15 c.m. long, 2-3 c.m. wide; seed 7-10 m.m. long, oblong flat. Abundant throughout the Province, as also in Natal and in West Africa. Much used in Natal for naves and other wagonwood purposes, but as it is practically cut out there and in demand in Cape Colony and Transvaal for these purposes, there is an opening for export from this Province, where the material is abundant and good. See "Forest Flora of Cape Colony," page 213, Plate LXII.

PLATE LVIII. 1, Flowering branch; 2, Flower; 3, 4, Central flower,  $\times 2$ ; 5, Stipule,  $\times 2$ ; 6, Seed; 7, Section of same; 8, Tree, general aspect (much reduced); 9, Pod; 10, Section of same.

As the species of *Albizzia* are more or less regularly deciduous and several may have been without leaves, flowers or fruit during my visit to Zambesia, I introduce here the following species included in the "Flora of Tropical Africa" as belonging to the Province, though not found in recognisable form by me:—

- A. anthelmintica**, A. Brogn. "A shrub or small tree (in Zambesi-land occasionally with a trunk 3-4 ft. in diam.) wholly glabrous or extremities petioles and peduncles in the Zambesi plant minutely pubescent. Leaf rachis  $\frac{1}{2}$ -3 in. long, usually with minute glands; pinnæ 2-3 (1-4) jugate; leaflets 2-3 (-5) jugate, the upper larger, obliquely obovate or obovate elliptical, obtuse, mucronate, glabrous, glaucescent, reticulate, paler or glaucescent beneath, the upper varying to  $1\frac{1}{2}$  inch in length, usually smaller, petiolule  $\frac{1}{2}$  line or less. Peduncles fascicled or solitary in the upper axils or from leafless nodes on the older wood, about  $\frac{1}{2}$  inch long. Flowers 'whitish,' sub-sessile, on pedicels  $\frac{1}{6}$  in. Calyx infundibuliform, denticulate, at length irregularly split, half as long as petals which are connate  $\frac{2}{3}$ . United base of the filaments included. Legume 2-6 in. long, few-seeded, narrowed at the base, often sinuous from abortion of seeds,  $\frac{1}{2}$ - $\frac{3}{4}$  in. broad in our specimens. . . . . Shire River, Zambesia (*Dr. Meller*!). The bark is used as an anthelmintic in Abyssinia. 'Wood hard, and used in canoe-making in Zambesi-land' (*Dr. Meller*)."
- A. glabrescens**, Oliv. "A large tree; extremities minutely rusty-pubescent, early glabrous or nearly so, lenticellate, dark reddish brown. Leaf rachis 1-3 in., glabrate, eglandular (in our specimens); pinnæ 2-1 jugate; leaflets 4-6 jugate, shortly petiolulate, oblique or sub-falcate, oblong-rhomboidal or ovate-lanceolate, obtuse, the uppermost pair largest, glabrous or midrib puberulous above, shining, reticulate, with the lower lateral nervure prolonged half the length of the leaflet, varying to 2 in. in length, the lower frequently not half as long; petiolule  $\frac{1}{2}$  line long. Peduncles one inch, fascicled in the nodes, and racemosely or corymbosely crowded on leafless shoots 2-3 in. in length. Inflorescence pubescent more or less. Pedicels equalling the calyx or flower. Calyx tubular campanulate, 5-dentate, 1 line long. Petals united  $\frac{2}{3}$ , twice as long as the calyx. United base of the filaments included. Zanzibar; and Kongone, Zambesi, growing in open spaces between the lines of mud creeks; *Dr. Kirk*."
- A. Lebbeck**, Benth. "Tree; extremities wholly glabrous or puberulous. Leaf rachis 3-9 in., with a large sessile gland near the base, with usually one or more inter-jugal glands; pinnæ usually 2-4 jugate; leaflets 3-9 jugate, elliptic-oblong, or the upper more oblique and obovate-oblong, very obtuse or retuse, sub-sessile, glabrous, reticulate, 1-2 in. long,  $\frac{1}{2}$ - $\frac{3}{4}$  in. broad. Peduncles 2-4 in., fascicled from the upper axils or corymbosely; flowers glabrate or puberulous, capitate, on pedicels of 1-3 lines. Calyx  $1\frac{1}{2}$ -2 lines long, with short deltoid teeth. Free extremities of petals ovate-lanceolate. United base of the filaments included. Legume  $\frac{1}{2}$ -1 ft. long, 1-1 $\frac{3}{4}$  in. broad, . . . . . (*Upper Guinea and Nile-land*.) Mossambique district, near the coast-line, *Dr. Peters*."
- A. Petersiana**, Bolle, in Peters' Mossamb. Bot., 1, t. 1. "Shrub, wholly glabrous or young extremities obsoletely puberulous. Leaf rachis  $\frac{1}{2}$ -2 in. long, with a sessile gland near the base; pinnæ 2-4 jugate; leaflets 3-6 jugate, sub-sessile, obovate-rhomboidal, obtuse glabrous,  $\frac{1}{3}$  to little over  $\frac{1}{2}$  in. in length; the upper sometimes nearly 1 in. long, and over  $\frac{1}{2}$  in. broad (*Bolle*). Peduncles 1-1 $\frac{1}{2}$  in. long, slender, fascicled from leafless nodes, forming short corymbs. Flowers 'purple,' glabrous. Calyx tubular campanulate, dentate, about 1 line long. Petals united  $\frac{3}{4}$ - $\frac{4}{5}$ , five times longer than the calyx, forming a tubular corolla dilated at the throat. Staminal tube slender, far exserted. Legume not seen. Zambesi, *Dr. Peters*; Rovuma River, 28 miles from the coast, *Dr. Meller*!"

#### FAMILY XXIX.—ROSACEÆ.

A very large Family of trees, shrubs and herbs, having widely different characters, but as it is represented in the ligneous flora of this Province by only 2 species, the characters of those species are all that are required here, alike for the Family and genera.

126. **PYGEUM africanum**, Hook, f. *Vern. names*—1, Red Stinkwood; Bitter Almond; 14, Roode Stinkhout. A large evergreen tree, 15-25 metres high, 50-100 c.m. diameter of stem, with heavy glossy foliage resembling Portugal Laurel. Leaves alternate, simple, elliptic-oblong, acute, tapering to both ends, 8-10 c.m. long, 3-4 c.m. wide, thinly coriaceous, glabrous, crenate-serrate, the lower pair of teeth glandular; the venation reticulate, with a distinct midrib in continuation of the channelled petiole of 3-4 c.m. length. Stipules minute, caducous. Flowers in racemes 5-7 c.m. long, axillary singly on the lower parts of the young shoots, or on

special side-shoots. Racemes 15-30 flowered; inflorescence and calyces glabrous. Flowers 1 c.m. across, hermaphrodite; calyx with 5 short teeth; petals and stamens evidently perigynous, petals white, 6 m.m. long, softly hairy and somewhat fringed. Stamens numerous, perigynous, longer than the petals, spreading in a circle. Ovary superior, sessile, short, free, consisting of a single carpel with a terminal style, a capitate stigma and 2 pendulous collateral ovules. Fruit leathery, transversely oblong or somewhat 2-lobed, 1-seeded, green, 1 c.m. long, 15 m.m. wide. Cotyledons twisted. An important timber tree for wagon-wood wherever obtainable, as it is in Cape Colony, Natal, and West Tropical Africa, while Sir J. Kirk found it in Mozambique district at the foot of Mount Tschiradzuna, 3000 feet, and near Munguzi. This tree is easily recognised, and I did not see it in the Province, but think it probably extends along the western border. For uses and illustration see "Forest Flora of Cape Colony," 215, Plate LXIII.

127. **PARINARIUM**, Mabola, Oliv. *Vern. names*—1, Hissing-tree (Miss Gibbs); 16, Mola or Mabola Plum, *Dr. Kirk*; Mkuna (Miss Gibbs). A large evergreen tree, having alternate, coriaceous, entire, simple, oblong, obtuse leaves, tomentose on the under surface; terminal and axillary panicles of cymose flowers; sepals and petals 5; stamens 7-8, perigynous; ovary sessile in the mouth of the calyx tube, more or less 2-celled, with 1 ovule in each. "Drupe sub-globose or plum-like, with a thick bony 2 or 1-celled putamen; pulp strawberry-like in flavour." Found in Zamhesia by Sir J. Kirk. Other species occur northward and westward.

#### FAMILY XXX.—SAXIFRAGACEÆ.

A large Family with considerable range of characters and as it is represented in the ligneous flora here by only 1 aberrant species the characters of that will suffice.

128. **BREXIA**, madagascariensis. Bot. Reg. t. 730. A very variable glabrous shrub, 3-5 metres high, growing among mangroves on tidal mud from Delagoa Bay northward. Leaves alternate, obovate, coriaceous, 8-15 c.m. long, 5 c.m. wide, toothed or sub-entire; cymes axillary, few-flowered; flowers 3 c.m. across, greenish, 5 merous; stamens 5, sub-hypogynous; ovary superior with a single style, 5-celled, with numerous ovules. Fruit drupaceous, woody, oblong pointed, 7 c.m. long, 3 c.m. wide, 1-celled, many-seeded.

#### CALYCIFLORÆ. GROUP II. SECTION 2.

Ovary usually inferior, 2 or several-celled (except Combretaceæ). Seeds exalbuminous (except Weihea). Style undivided. Stamens numerous, or twice as many as the petals.

#### FAMILY XXXI.—COMBRETACEÆ.

Flowers perfect or polygamous; inflorescence in terminal or axillary spikes or racemes, (or these when terminal and axillary forming a panicle,) or sometimes capitate. Calyx-tube adnate with the ovary, spreading above and 4-5 parted. Petals 4-5 small or minute, or absent, rising from the margin of the calyx-tube. Stamens as many or twice as many as the petals. Ovary inferior, 1-celled, with 2-5 pendulous ovules. Style single; fruit angled or winged. Seed exalbuminous, solitary pendulous. Trees, shrubs, or scandent trailers, with simple, entire, exstipulate leaves.

129. **COMBRETUM**. Flowers perfect or polygamous; inflorescence in spikes, racemes, or panicles. Calyx attached to the narrow ovary, and spreading, cup-shaped, above. Flowers 4-5 merous; petals very small, stamens 8-10 in 2 rows. Style protruding; ovary 1-celled, ovules several. Fruit 4-winged, 1-celled, 1-seeded, indehiscent. Leaves simple, entire, opposite, verticillate or alternate, exceedingly variable on one tree and at different stages of growth. Trees, shrubs, or climbers, widely distributed, and forming a large proportion of the ligneous flora in some parts of this Province.

**C. constrictum**, Laws. (= *Poivrea mossambicensis*, Klotzsch in Peters' Mossamb. Bot. 78, t. 13.) Climbing shrub with 5-merous flowers, obovate-elliptical pointed leaves 6-10 c.m. long, almost glabrous, dotted white, above petiole bases remaining hardened as spines; flowers large, in racemes mostly terminal; petals fringed. Mozambique. Dr. Peters.

**C. pentagonum**, Laws. "Tree. Young branches round, hairy. Leaves opposite, shortly petiolate, oval or obovate, 5-8 in. long, 3-3½ in. broad, glabrous above, hairy beneath. Flowers? . . . . Fruit roundly-oblong, 1¼ in. long, 1 in. thick, with 5 rounded angles. Rovuma River, Dr. Meller."

Another climbing shrub with bright red secund flowers, possibly the West African *C. grandiflorum*, Don, or a new species, is abundant in the Umhelusi Valley, Lourenço Marques, covering trees with its vigorous climbing growth, and making a bright display in early Spring.

**C. lomense.** (New species.)<sup>1</sup> Flowers sessile in spikes arranged as a terminal panicle, each flower subtended by a lanceolate bract, each spike in the axil of a leaf or large bract; younger parts densely villose or canescent, older foliage varying from villose to glabrescent on the upper surface, hairy on the veins beneath. Leaves sub-opposite or occasionally alternate, 2-4 c.m. long, 1-2.5 c.m. wide, shortly elliptical, with a petiole 3 m.m. long and a minute point; opaque on the upper surface; the many and reticulated veins in relief on the under surface. Flowers 7 m.m. long, the ovary densely hairy, the tube very slender, and the calyx-limb open, 4-toothed, glabrous within, but with an annular disc densely hairy on its inner surface. Petals 4, unequal, plaited, rising from the mouth of the calyx, the limb wider than deep and narrowed suddenly into a narrow claw; stamens 8, 4 rising from below the petals and 4 alternate with them, all outside the disc, incurved when young, finally much exerted. Pistil slender, pointed; ovary 1-celled with 2 ovules; the tube breaking off above the ovary at an early stage. Fruit unknown. Sent from Mozambique together with *Weihea* (?) sub-peltata, evidently mismated, as "*Mocurusse*;" presumably this was scandent on or growing intermixed with the *Weihea*, which, as shown by the attached timber specimens, owned the native name. No further information is to hand as to its habit or habitat. Sim 6393.

Plate LXI. B. 1, Part of panicle; 2, Leaf-shoot; 3, Section of flower,  $\times 3$ ; 4, Flower,  $\times 3$ ; 5, Stamen,  $\times 10$ ; 6, Pistil,  $\times 10$ ; 7, Ovary and sections,  $\times 3$ .

**C. elaeagnoides**, Klotzsch (in Peters' Mossamb. Bot., 73.) A small tree with pubescent virgate branches and silvery grey bark. Leaves opposite, petiolate, 12 c.m. long, 3 c.m. wide, glabrous above, pale and lepidote below. Inflorescence racemose, lepidote. Flowers small. Style without glands. Fruit orbicular 2-2.5 c.m. long. Tete, Zambesi, Dr. Kirk.

**C. truncatum**, Welw. Vern. names—4, Mondu, and Mondu-n-hlovu. A very large spreading tree 20-30 metres high, 30-100 c.m. diameter of stem, covered with silvery grey scales, and with deeply fissured and cross-cracked light grey bark in squares  $5 \times 2$  c.m. or less. Vigorous young growth, lepidote, squarrose and spinescent, the spines axillary, 2-8 c.m. long, and either with or without leaves. Leaves 3-10 c.m. long, 1-2.5 c.m. wide, lanceolate or obovate, tapering to an acute point or rounded and mucronate, lepidote, and with slender petioles 3-10 m.m. long. Inflorescence spicate; spikes axillary and terminal on short side branches; flowers small; style covered with glands; fruit 15 m.m. long, 10 m.m. wide, 4-winged, tipped by the style, covered with scales. Tree silvery grey from the scales, rigid, erect and squarrose, and much like an *Elaeagnus* when young, a very large tree when old, with rather brittle and most durable timber, so hard that before the advent of iron hoes this was used instead. Frequent in Lourenço Marques, Maputa and Marracuene; present also but not frequent from the Limpopo to Inhambane. North of Quelimane it was not noticed, except in one place between Mucuba and Nhamacurra, but there it was abundant for half-a-mile, and no other tree mixed with it except a small *Protea*.

"This species may be readily distinguished from all other African *Combretes* by its glandular style. The wood is described as being exactly like that of *lignum-vitæ*. The native name for it in the Mozambique country is *Mozambiti*."<sup>2</sup>

Plate LXII. B. 1, Fruiting branch; 2, Shoot of coppice or young tree; 3, Frequent size and form of leaf; 4, Young leaf showing scales; 5, Section of fruit; 6, Portion of leaf (magnified) showing scales.

**C. arengense.** (New species.)<sup>3</sup> Vern. name—10, Katumba. A tree with opposite elliptic-obovate or elliptic-lanceolate leaves 10-15 c.m. long, 5-9 c.m. wide, narrowed to the blunt point, rounded at the base, shortly petiolate, firm, glabrous but set with minute silvery scales on the lower surface; main and cross veins in strong relief. Spikes axillary to the lower leaves, 5 c.m. long; fruit 1.5-2 c.m. long, 4-winged, at first rusty-ferruginous, the wings afterwards glabrous and shining. Sim 5916. Magenja da Costa.

Plate LXIII. B. 1, Leaf; 2, Portion of same, showing white scales; 3, Fruit.

<sup>1</sup> *Combretum lomense*. (Sp. nov.) Inflorescentia spicatum in axillis foliorum in panícula apicali dispositarum; partibus junioribus dense villosis vel canescentibus, foliis demum in pagina inferiore subvillosis vel glabrescentibus, paginae inferioris venis reticulatis prominentibus hirsutis, foliis sub-oppositis vel alternis, 2-4 c.m. longis, 1-2.5 c.m. latis, late ellipticis, petiolo 3 m.m. longo, apice breviter mucronato; floribus sessilibus, 7 m.m. longis, ovario dense hirsuto; calycis tubo angustissimo, limbo patente, 4-dentato, intus glabro nisi disco annulari pilis dense vestito; petalis 4, inaequalibus, plicatis, e tubo calycis ortis, petali lamina lata, ungui angusto; staminibus 8 in seriebus duabus alternatim dispositis, junioribus incurvis, demum longe exsertis; pistillo gracili, acuto; ovario 1-loculari, ovulis 2; fructibus laud visis, E. Mozambique missa cum *Weihea* (?) subpeltata, super quam verisimiliter scandet. Sim 6393. Tab. LXI. B.

<sup>2</sup> "Flora of Tropical Africa," II., 427.

<sup>3</sup> *Combretum arengense*. (Sp. nov.) Arbor; foliis oppositis elliptico-obovatis vel elliptico-lanceolatis, 10-15 c.m. longis, 5-9 c.m. latis, apice obtusis, basi rotundatis, breviter petiolatis, firmis, in pagina superiore glabris, in pagina inferiore pilis argenteis squamosis tectis, venis prominentibus; inflorescentiis in axillis foliorum inferiorum sitis, spicatis, 5 c.m. longis; fructibus 1.5-2 c.m. longis, 4-alatis, primo robiginosis, alis demum glabris nitidis. Magenja da Costa. Sim 5916. Tab. LXIII. B.



- C. bajonense.** (New species.)<sup>1</sup> *Vern. name*—10, 11, Katumba. A small tree with leaves opposite, oval to elliptical, 7 c.m. long, 4.5 c.m. wide, rounded at the base and apex but shortly pointed and with petiole 1.5 c.m. long, glabrous and shining above, minutely pubescent below; the cross veins not prominent. Spike axillary 2.5-5 c.m. long; flowers not seen; fruit 4 c.m. long and wide, 4 winged, rusty-ferruginous. Magenja da Costa. Sim 5715.

PLATE LXIII. C. 1, Leaf; 2, Fruit.

- C. ellipticum.** (New species.)<sup>2</sup> *Vern. name*—10, 11, Inama. A small tree with leaves usually opposite, elliptical, 10-15 c.m. long, 4.5 c.m. wide, rounded below, rounded and bluntly pointed or sometimes acute at the apex, the upper surface woolly or pubescent, the under surface densely canescent; petiole 4-7 m.m. long. Leaves of coppice shoots often in threes, 15-20 c.m. long, obovate and acute. Spikes axillary, 3.5 c.m. long, and like the young wood white with soft short hairs. Fruit 2 c.m. long, 4-winged, at first foxy, afterwards with yellow glabrous wings. Flowers not seen. Magenja da Costa. Sim 6068.

PLATE LXIII. D. 1, Leaf; 2, Fruit.

- C. microphyllum,** Klotzsch (in Peters' Mossamb. Bot., 74). *Vern. names*—4, Hlaba-konkonya; 15, Mhlalavan. A small tree, 3-6 metres high; young growth pubescent; leaves opposite, alternate or 3-4 whorled, pubescent when young, glabrous or glabrescent when old, shortly obovate, 3.5 c.m. long, 2.3 c.m. wide, shortly pointed. Spikes axillary, numerous, 5 c.m. long, pubescent. Flowers yellow, 4-nate. Fruit 2 c.m. long. Abundant at Umbelnsi and Lebombo (extra-tropical). Timber hard and durable, but stem usually gnarled and often unsound.

PLATE LXII. A. 1, Young foliage; 2, Old leaves; 3, Inflorescence; 4, Flower,  $\times 3$ ; 5, Fruit.

- C. Kraussii,** Hochst. *Vern. names*—4, 15, Shuanduan or Chivondwana Kakutu; 6, Chicaente; 13, Undubu-we-lilati. A large tree. Twigs, younger growth and inflorescence puberulous or minutely pubescent. Leaves mostly opposite, obovate, bluntly pointed, tapering to the short petiole. Spikes oblong, axillary, 2.3 c.m. long, on 3 c.m. peduncles, many-flowered, pubescent. Fruit 1.5 c.m. long and wide, widely winged. Bark thin, smooth, green on young wood, dark and furrowed on old stems. Foliage red in autumn and winter, while the fruits are yellowish-white and look like flowers from a distance. This large species which is frequent in Pondoland and Natal extends more sparingly through Maputa, Marracuene, Gaza and M'Chopes, the stem sometimes 1 metre in diameter. For illustration see "Forest Flora of Cape Colony," p. 222 and Plate LXIX. The vernacular names of several somewhat similar species of *Combretum* are more or less transferable.

- C. holosericeum,** Sond. *Vern. name*—4, 15, Mbondo-m-nyama. Tree 4-8 metres high with extremities and young parts silky-pubescent, and with rugged black bark from which it takes its native name. Leaves ovate or obovate from a rounded or sub-cordate base, bluntly pointed, 6.9 c.m. long, 5.7 c.m. wide, tomentose below, pubescent above, and with petiole up to 1 c.m. long. Spikes axillary, or more usually axillary to bracts on short young branches from the lower axils of last year's wood, these flowering branches having foliage crowns, and at least sometimes growing into leafy branches. Flowers 4-nate. Fruits 2 c.m. long, somewhat pubescent. Timber very hard and durable but gnarled and unshapely, and seldom of large size. Abundant on and below the Lebombo in Maputa and Marracuene (extra-tropical); also present in the Transvaal.

PLATE LXII. C. 1, Flowering branch; 2, Leaves (medium or small); 3, Flower,  $\times 3$ ; 4, Fruit.

- C. Zeyheri,** Sond. *Vern. name*—4, 15, Mbondo-m-hlope, which name is shared with *C. salicifolium*. A small tree, with densely tomentose branches and younger parts, and with nearly white old bark from which it takes its native name. Leaves opposite, elliptic-lanceolate, 10 c.m. long, 5 c.m. wide, acute, rounded below, rigid, glabrous above, almost glabrous on the petiole and veins, minutely pubescent on the under surface, and with petiole up to 1.5 c.m. long. Spikes axillary. Fruits 3.5 c.m. long, wings 7-10 m.m. deep, glabrous. Timber hard, durable, gnarled. Frequent on the Lebombo Range in Maputa and Marracuene; occurs also in the Transvaal.

PLATE LXIII. A. 1, Branch with leaf and fruit; 2, Young inflorescence; 3, Flower,  $\times 4$ ; 4, Petal,  $\times 8$ .

- C. apiculatum,** Sond. Unknown to me; included in "Flora of Tropical Africa" among those having the leaves sparingly lepidote, at least when young, and the fruits large, and described thus:—"Small tree. Branches round, glabrous. Leaves opposite, shortly petiolate, elliptic or elliptical-oblong, 2½-3 inches long, 1¼-1½ inches

<sup>1</sup> *Combretum bajonense*. (Sp. nov.) Arbor parva; foliis oppositis, ovalibus vel ellipticis, 7 c.m. longis, 4.5 c.m. latis, utrinque rotundatis nisi apice subacuto, petiolo 1.5 c.m. longo, in pagina superiore glabris nitidis, in pagina inferiore pubescentia tenui vestitis, venis transversis non conspicuis; inflorescentiis axillaribus spicatis, 2.5-5 c.m. longis; fructibus 4 c.m. longis et latis, albis 4 robiginosis praeditis. Magenja da Costa. Sim 5715. Tab. LXIII. C.

<sup>2</sup> *Combretum ellipticum*. (Sp. nov.) Arbor parva; foliis plerumque oppositis, ellipticis, 10-15 c.m. longis, 4.5 c.m. latis, basi rotundatis, apice tantum non obtusis vel interdum acutis, in pagina superiore lanosis vel pubescentibus, in pagina inferiore dense canescentibus; petiolo 4-7 m.m. longo. Ramorum in virgultis foliis saepe ternis, 15-20 c.m. longis, obovatis, acutis; inflorescentiis axillaribus, spicatis, 3.5 c.m. longis, albis, pilis mollibus brevibus vestitis; fructus 2 c.m. longi albis 4, primo rufis, postea fulvis glabris. Magenja da Costa. Sim 6068. Tab. LXIII. D.

broad; reflexed at the apex, glabrous. Flowers in solitary spikes as long as the leaves. Calyx-limb campanulate. Petals minute, obovate, fringed with hairs, yellow. Fruit cordate-ovate, 1-1½ in. long, 9 lines broad, lepidote, golden yellow; pedicels 3-6 lines long. . . . Between Tete and the sea. Zambesi; Dr. Kirk."

**C. myrtifolium**, Laws. *Vern. name*—10, M'duro. One of the most common and valuable trees in the forests of Quelimane, Maganja da Costa and Nhamacurra, glabrous except on the youngest growth. Leaves 5-8 c.m. long, 1.5-2.5 c.m. wide, lanceolate or oblong-lanceolate, acute, on slender petioles 10-15 m.m. long. Inflorescence axillary to the upper leaves, with slender peduncles 2-3 c.m. long, and with fruits 5-7 in an umbel; fruits 15 m.m. long, 2-3-4 winged on 15 m.m. pedicels. Trunk used for dugout boats (Mandees).

PLATE LXIV. C.

**C. salicifolium**, E. Mey. *Vern. names*—1, Bush Willow; 4, 13, Umdubu; 4, Mbondo-m-hlope; 10, Ne-onya. A tree 4-10 metres high, always growing near water, and having very light-coloured smooth bark, and the young growth finely pubescent. Leaves opposite, alternate or whorled, 7-10 c.m. long, 1-2.5 c.m. wide, increasing in size and changing in form with age, bluntly lanceolate, shortly petioled, deciduous or semi-deciduous, becoming red before falling. Spikes axillary, on peduncles 2.5 c.m. long; flowers polygamous, dimorphic, capitate spicate. Fruit 2 c.m. long, 1.5 c.m. wide, wings glabrous. Frequent on the rivers of Maputa and Marracuene, present also in M'Chopes (*extra-tropical*), and on the Lecungo River, Maganja da Costa (*tropical*); also abundant in Cape Colony and Natal. For illustration, &c. see "Forest Flora of Cape Colony," page 222, Plate LXIX.

Three other species collected on the Zambesi by Sir John Kirk are shrubs or climbers, with fruits an inch long or more, and appear to be of little forestal importance, viz. :—

**C. Kirkii**, Laws. A climber, somewhat lepidote on young parts. Leaves obovate, 7-10 c.m. long, 2.5-3 c.m. wide; flowers in spikes; fruit 5 c.m. long, 4 c.m. wide, including the decided wings.

**C. tetragonum**, Laws. Shrub, with oval or elliptical pubescent leaves 7-12 c.m. long, 3-6 c.m. wide, hairy on the veins beneath and with the spaces between lepidote. Fruit 3 c.m. long, 2 c.m. wide, angled but not winged.

**C. tomentosum**, Don. A villose climber, not lepidote. Leaves oblong-elliptical, 3-5 c.m. long; flowers in long woolly spikes; fruits winged, 2.5 c.m. long, finely red-pubescent.

130. **TERMINALIA**. Flowers perfect or polygamous, small, greenish, in axillary spikes. Calyx constricted above the ovary, 5-toothed; teeth deciduous. Petals absent. Stamens 10, in 2 rows; ovules 2-3, pendulous. Fruit compressed or samaroid, 1-seeded. Trees or shrubs; branches sometimes rigid or spinose. Branches often leafless below, leaves simple, entire, alternate. *T. Catappa*, Linn., an Indian deciduous species, is frequently cultivated in the Province as an ornamental tree and for the sake of its fruit-kernels, which are edible; other exotic species yield dyes and tans from the fruits or bark, including the well-known Myrabolans of trade.

**T. sericea**, Bruch. *Vern. name*—4, Cunona. A silvery-grey evergreen tree 5-25 metres in height, with a dense round crown and abundant foliage. Whole tree finely canescent, except the grey or decorticated stems. Twigs spreading, leafless below; leaves crowded upward, 7-10 c.m. long, 2-3 c.m. wide, oblanceolate or narrowly obovate, usually pointed, sometimes rounded, very shortly petioled. Spikes lateral, 3-5 c.m. long; flowers bracted; fruits much compressed or somewhat 2-winged, 3 c.m. long, 2 c.m. wide, tapering to both ends. A useful timber tree with a yellow timber used for felloes, &c. Abundant on certain strata throughout the extra-tropical part of the Province; seen also, but less abundantly, north of the Zambesi (*tropical*).

PLATE LXIV. A. 1, Fruiting branch, and showing gall common on branches; 2, Leaf of young vigorous tree or coppice shoot; 3, Transverse section of fruit.

**T. prunioides**, Laws. Unknown to me, but collected near Tete by Sir John Kirk and distinguished by having spine-like shoots bearing fascicles of leaves at their tips; leaves 2.5-5 c.m. long, obovate, glabrous above, covered beneath with long silky adpressed hairs. Samara stalked, elliptic or oblong, 5 c.m. long, 4 c.m. wide; wings puckered at the margins, purple, glaucescent.

**T. Brownii**, Presl. An Abyssinian species found near Tete by Sir John Kirk, having leaves 7-15 c.m. long, broadly lanceolate or elliptic, acuminate, glabrous above, puberulous beneath and on the 12 m.m. petioles. Samara broadly lanceolate or elliptic, variable in size, 3-7 c.m. long, purplish-red, glaucescent.

- T. obovata.** (New species.)<sup>1</sup> *Vern. name*—10, Mumbariba. A tree 6-12 metres high. Leaves more or less crowded toward the end of twigs, which are leafless below; leaves 7-15 c.m. long, 4-6 c.m. wide, obovate to elliptical, bluntly pointed, tapering below, pubescent below, ultimately glabrescent above. Petiole 10-15 m.m. long. Fruits 3-4 c.m. long, 2 c.m. wide, 2-winged, tapering to the apex and tapering to the 1 c.m. peduncle. Frequent in Magenja da Costa. Sim 5672.

PLATE LXIV. B.

131. **LUMNITZERA.** One African species, as under:—

- L. racemosa**, Willd. *Vern. name*—10, Mormoni. A saline or mud mangrove, shrub or tree up to 10-12 metres high, with alternate, succulent, leathery, obovate, crenate leaves 3-5 c.m. long, 3 c.m. wide, tapering to the short petiole. Spikes axillary, 3-8 c.m. long, 5-10 flowered. Ovary 1-2 c.m. long, 4 m.m. diameter compressed, somewhat curved, surmounted by the 5 short deltoid calyx-teeth, 1-celled, with 5 pendent ovules, and supported at the base by an attached bract on each side. Petals 5, 5 m.m. long, bluntly pointed, concave, white. Stamens 10, exerted, as long as the conical pistil. Seeds 5, linear. Abundant among mangroves on tidal mud from the Zambesi northward, usually much-branched, bushy, and brittle.

PLATE LXXVII. 1, Flowering and fruiting branch; 2, Flowers,  $\times 3$ ; 3, Calyx,  $\times 3$ ; 4, Section of calyx and ovary,  $\times 3$ ; 5, Section of flower,  $\times 6$ ; 6, Petal,  $\times 10$ ; 7, Seed,  $\times 6$ ; 8, Section of ovary,  $\times 4$ ; 9, Section of tube of calyx showing 3 of the pendent seeds,  $\times 5$ ; 10, Anther,  $\times 10$ ; 11, Pistil,  $\times 6$ ; 12, Tree, general aspect.

#### FAMILY XXXII.—RHIZOPHOREÆ.

Glabrous trees or shrubs, often confined to tidal mud, with opposite or ternate simple leaves, axillary perfect, regular flowers, inferior or more or less superior 2 or more-celled ovaries, and ovules 2 in each cell, pendulous from the top. Stipules interpetiolar, caducous. Stamens 2-3 times the number of the petals. A small group, some members of which are present on most tropical shores; others occur in forests away from as well as on the coast.

132. **RHIZOPHORA.** Flowers leathery. Calyx-tube short, bracted, limb 4-parted. Petals 4, entire; stamens 8, almost without filaments, perigynous, the anthers long, many-celled. Ovary inferior, 2-celled; cells with 2 pendulous ovules. Fruit leathery, 1-celled, 1-seeded, germination taking place before the fruit drops. Leaves opposite, leathery, with caducous interpetiolar stipules. Represented by one variable species or several species, on all tropical shores.

- R. mucronata**, Lam. *Vern. names*—1, Red Mangrove; 2, Mangle (which applies also to other mangroves); 4, Stobani or Shi-thlo-bani; Staak; 10, Infise. A tree 8-12 metres high, confined to tidal mud. Leaves opposite, elliptical, bluntly pointed, petiolate, 7-10 c.m. long, 4-6 c.m. wide. Stipule intra-axillary, 7-10 c.m. long, sheathing. Cymes few-flowered, bracted. Calyx 4-fid, inferior; segments 15 m.m. long; petals shorter and smaller, and with 2 sessile lanceolate stamens opposite each. Fruit oblong, leathery, at length pierced by the radicle of the germinating embryo which continues to grow downward, sometimes for 30 c.m. before the fruit drops, and then on dropping pierces the soft mud and continues separate existence. Yields the mangrove bark of commerce, an article of export for tanning purposes, but often adulterated with other kinds. Frequently supported by adventitious roots from up the stem. Present on all tidal mud flats in the Province, but often only in young condition through the older material having been cut out for poles or hark. Now protected under Government regulation, and seeds are being planted to increase the stock. Grows rapidly and yields sound durable poles of red timber up to 30 c.m. diameter, or sometimes more.

- R. racemosa**, Meyer. A Tropical American species mentioned in "Annuario de Mocambique," 1908, is distinguished by having its flowers in paniculate divaricate shortly-jointed many-flowered cymes, and is not so far as I know found in the Province.

PLATE LXIX. 1, Branch with stipule, leaves, inflorescence and fruit; 2, Tree, general aspect (reduced); 3, Flower, opened out; 4, Petal and 2 stamens; 5, Position of stamens and pistil.

133. **BRUGUIERA.** Glabrous leathery trees inhabiting tidal mud. Flowers leathery, 2-5 c.m. long and wide, the calyx-tube without bracts, and having the sunk ovary at its base. Calyx-limb expanded, about 12-cleft; petals as many and of equal length, bifid, leathery, bearded along the margin, and with the lobes folded together enclosing the 2 stamens, which are set in pairs opposite each petal. Filament 12 m.m. long, anther 1 c.m. long; style 2 c.m. long, stigma 3-4 lobed. Ovary 2-4 celled, sunk in the calyx-tube. Fruit 12 m.m. long and wide, crowned by the calyx-lobes, and afterwards having the germinating embryo hanging 10-30 c.m. pod-like below.

- B. gymnorhiza**, Lam. *Vern. names* are shared with *Rhizophora mucronata*, from which by natives and even by bark collectors it is not distinguished, the general appearance being almost identical. Leaves opposite, 7-10 c.m. long, 2-5-4 c.m. wide, elliptical, acute, and tapering to the petiole. Calyx-tube embracing the ovary

<sup>1</sup> *Terminalia obovata.* (Sp. nov.) Arbor 6-12 m. alta; ramis infra nudatis, apicem versus foliosis; foliis 7-15 c.m. longis, 4-6 c.m. latis, obovatis vel ellipticis, sulcatis, pagina inferiore pubescente, pagina superiore postremo glabrescente; petiolo 10-15 m.m. longo; fructibus 3-4 c.m. longis, 2 c.m. latis, sursum et deorsum fastigatis, alis duabus præditis. Magenja da Costa. Sim 5672. Tab. LXIV. B.



or partly united with it, segments free, 10-12, lanceolate, 12-15 m.m. long, firmly leathery, green. Petals as many as the sepals, 2-fid, with a terminal hair between, and with 2 hairs to each point, glabrous-brown in front, hairy on back, and each enclosing 2 stamens. Ovary partly free, with a subulate style, and 3-4 fid stigma. Fruit 1-celled, 1-seeded, the seed germinating on the plant. Abundant in all tidal mud in the Province, often well inland; extends also to Natal and Cape Colony. Described under the name *B. cylindrica*, Blum. in "Flora of Tropical Africa," but I cannot separate two forms.

PLATE LXX. 1, Fruiting branch, showing leaves and stipule; 2, Calyx; 3, Petal,  $\times 3$ ; 4, Section of flower; 5, Petal and stamens,  $\times 2$ ; 6, Style and stigma,  $\times 4$ ; 7, Anther,  $\times 4$ ; 8, Tree, general aspect (reduced).

134. **CERIOPS.** One African species, as under:—

**C. Candolliana**, Arn. *Vern. names*—4, Chitwabane (which corresponds closely with the name of *Rhizophora*); 10, Mucandara; Nkandella. Shrub or tree 1-7 metres high, usually much branched, and confined to tidal mud. Branches somewhat angled, leaves opposite, entire, obovate, rounded at the apex, 2.5 c.m. wide, 7-8 c.m. long including the 2 c.m. petiole. Inflorescence axillary, peduncle 3-4 c.m. long, 5-10 flowered; flowers almost sessile, 1 c.m. long, mostly in pairs, bracted. Calyx cup-shaped, with 5 oblong-lanceolate segments; petals 5, oblong, 3-fid at apex and connected near the base by hairs from a gland each side of each. Stamens 10, of 2 lengths, the longer as long as the petals and pistil. Ovary conical and pointed, surrounded at the base by a ring of 2-fid glands, 1-celled, and having 5 pendent ovules, of which only 1 fertilizes. The seed germinates within the fruit on the tree, producing a green somewhat flattened and warted radicle 15-30 inches long, 6-12 m.m. wide, at the upper end of which the plumule grows inside a scarlet tube 12-25 m.m. long, produced from the fruit as the radicle grows. Frequent in tidal mud from Delagoa Bay northward.

PLATE LXVI. 1, Flowering branch, with 1 fruit; 2, Flower,  $\times 5$ ; 3, Flower, with calyx and corolla removed,  $\times 8$ ; 4, Same, with stamens also removed; 5, Petal,  $\times 10$ ; 6, Stamen,  $\times 30$ ; 7, Section of ovary,  $\times 5$ ; 8, Section of ovary, transverse; 9, Section of ovary, after fertilization; 10, Fruit, with radicle growing out; 11, Top of radicle, showing plumule starting inside scarlet tube.

135. **WEIHEA.** Glabrous trees with opposite simple leaves, opposite twigs, and axillary flowers, the pedicels rising from a 2-bracted base. Calyx-tube adhering more or less to the base of the ovary, its limb 4-5 parted. Petals fugaceous, lacerated at the apex. Stamens about 20, inserted in 1 row. Ovary not quite free, 3-celled; ovules 2 in each cell, pendulous. Berry 3-celled, 3-seeded; seeds albuminous. A small order belonging to Africa and its islands and to New Zealand.

**W. madagascariensis**, Spreng. A small tree 5-7 metres high, with twigs very regularly opposite, usually blackish. Leaves ovate-lanceolate, evergreen, finally thinly coriaceous, 8-15 c.m. long, 3-4 c.m. wide, varying from almost entire and rather blunt to strongly-toothed and acute. Pedicels 1 or several, rising from a bracted cup in the axils of the younger leaves, 2 c.m. long, 1-flowered, but jointed near the top. Calyx outwardly pubescent; limb 5-parted. Petals very fugaceous, 1 c.m. long, embeate, divided into 8-12 linear divisions at the point. Pistil as long as the calyx-lobes, 3-lobed at the apex. Ovary hairy, 3-celled; berry less hairy, 3-seeded. Stipules small, intrapetiolar, caducous. For illustration see "Forest Flora of Cape Colony," page 224, Plate LXX. Occurs occasionally but nowhere in abundance, throughout the Province; also in Cape Colony, Natal and Madagascar. Not confined to the coast.

**W. (?) subpeltata.** (New species).<sup>1</sup> *Vern. names*—4, Umbitzan; 11, Mocurusse; 15, Bekungu. A large tree, up to 30 metres in height and 90 c.m. diameter of stem, gregarious, and making a dense pure forest. Leaves opposite, entire, 5-7 c.m. long, 4-6 c.m. wide, ovate, rounded at the apex, widely rounded at the base, and connected with the petiole 4-7 m.m. inside the lamina, from whence rises the midrib as well as 4 other veins not more prominent than the irregularly-disposed veins leaving the midrib further up. Leaves glabrous above, at first densely woolly below, afterwards glabrescent, petioles 1-2 c.m. long, slender, woolly, especially at the base. Stipules interpetiolar, flat, connate, 2.5-3 c.m. long, 7-10 m.m. wide, rounded at the apex, pubescent at first, striated longitudinally and with thickened connate margins; early deciduous. Flowers and fruit unknown. Bark grey, fissured both ways, red under the cortex, thin. Sent from Mozambique in connection with an application by the Railway Department as to its suitability for sleepers; also collected by me in dense pure thickets in kloofs on the Lebombo Mountains (extra-tropical) where its timber is well known, but not seen elsewhere. In the absence of flowers and fruit the genus of this tree cannot be definitely decided, but the stipules afford a strong key to the Family. No trace of flowers or fruit was found in the Lebombos, where however I was informed separately by all my informants, English, Dutch, Kafir and Swazi, and unknown to one another, that bees nesting in this tree made poisonous honey. Whether this was caused by

<sup>1</sup> *Weihea (?) subpeltata.* (Sp. nov.) Arbor grandis, gregaria, 30 m. alta, caule 90 c.m. diam.; cortice tenui in longitudinem et in transversum diffisso, cano, intus rubro; foliis oppositis, integris, ovatis, apice basique rotundatis, 5-7 c.m. longis, 4-6 c.m. latis, petiolo 1-2 c.m. longo, lamina subpeltata pagina superiore glabra, pagina inferiore primo dense lanosa, postremo glabrescente; stipulis cito deciduis inter petiolos connatis, obtusis, planis, 2.5-3 c.m. longis, 7-10 m.m. latis, primo pubescentibus, in longitudinem striatis, marginibus crassis; floribus et fructibus haud visis. Mozambique et mont. Lebombo. Sim 6387. Tab. L.XI. A.

contact with the timber or by the source of supply no one knew, but it is the only tree, so far as I know, which has such a reputation. I saw no outwardly damaged tree, though I saw all ages, fine, clean, straight stems in every case; but I was informed that the very large trees are usually hollow. Sim 6387.

## PLATE LXI. A.

136. **CASSIPOUREA.** Glabrous trees with opposite or verticillate entire leathery leaves, caducous intrapetiolar stipules, axillary inflorescence, superior 3-4 celled ovary with filiform style and 2 pendulous ovules in each cell. Calyx campanulate, shortly 5-7 lobed; petals 5-7, small, funbricate at the apex, and inserted on a crenulate disc at the base of the calyx-tube; stamens 10-14, with filiform filaments, united below. Ovary 2-celled, cells 2-ovuled. Fruit ovoid, ultimately dehiscent; cells 1-seeded; seeds arillate; albumen fleshy. A small genus into which *Dactylopetalum* might be merged.

**C. verticillata**, N. E. Brown. A small evergreen tree, with ternate and opposite (or sometimes 4-nate) oblong coriaceous entire or almost entire leaves, 10 c.m. long, 4-5 c.m. wide, axillary flowers, many crowded together, and dehiscent fruits 1 c.m. long, resembling those of *Gymnosporia*, and with similar yellow arillate seeds, rather conspicuous on the tree for a time. Present but not common through Maputa, Marracuene, Gaza and M'Chopes. For illustration see "Natal Plants," Plate 276.

## FAMILY XXXIII.—MYRTACEÆ.

Trees or shrubs with simple, entire, leathery exstipulate leaves, often with pellucid dots; paniculate or axillary inflorescence, hermaphrodite flowers; inferior ovary; sepals and petals 4-5; stamens numerous, free; ovary 2-3 celled; ovules few or many in each cell, from or near the base, style simple, filiform; fruit a berry or a dry dehiscent capsule. Seeds few, exalbuminous. A large family, well known by such representatives as the Australian Eucalypts (Gum-trees), the Guava, Rose-apple, Jambolan, Brazilian Cherry, Cloves, Allspice, Myrtles, Australian Myrtles, Pomegranates and Bottle-brushes. I am not aware that the Clove (*Caryophyllus*) comes within the limits of the Province, though it occurs on the coast and islands further north.

137. **EUGENIA.** Calyx-tube short, flat, and disc-like or cup-shaped, limb 4-5 parted; petals 4-5, inserted with the numerous stamens on the edge of the calyx-tube. Ovary inferior, 2-celled. Fruit a fleshy berry, crowned by the calyx-lobes, usually 1-seeded. Seed, round, hard, stone-like. Trees or shrubs with pellucid dotted, simple, entire, glabrous, shining, opposite leaves, and terminal paniculate or axillary inflorescence. Principally a Central and South American genus.

**E. cordata**, Laws. *Vern. names*—1, Water-tree; 2, Water-boom; 4, 15, Muchô, Muhlu, or Munchlo; 13, Umswi and Umdoni; 15, Mkose. A medium sized, round-topped, glaucous tree, with opposite, nearly sessile, widely elliptical, bluntly pointed and somewhat cordate, entire, glabrous, coriaceous, subglaucous leaves 5-10 c.m. long, 2-5 c.m. wide, and paler on the under than the upper surface. Panicle terminal, cymose, many-flowered, with angular glabrous branches, trichotomously forked, all forks and flowers subtended by linear deciduous bracts, or the lower by leaves. Calyx-tube cup-shaped, with blunt shallow lobes. Petals united into a calyptra and breaking off at the base. Stamens numerous, at first inflexed, afterwards spreading, the numerous anthers forming the showy white part of the flower. Pistil cylindrical, as long as the stamens. Berry 12 m.m. long, oblong, acidulous, more or less edible, usually 1-seeded. All the younger wood quadrangular. Stem up to 60 c.m. diameter; usually grows near water; seldom found in dense forest, but often where grass fires clear off all other kinds. Frequent in the extra tropical parts of the Province, almost the only tree in the M'Chopes pans, and present also though less frequent in the tropical districts. Abundant in Cape Colony and Natal, and in writing of "Plant association at the Victoria Falls," Miss Gibbs arranges the local flora there in 3 groups, the first of which is the open veld, and concerning the others she says:—"The second region seems to be limited to the immediate banks of the Zambesi River and islands above the Victoria Falls in which the dominant plant is *Eugenia guineensis*. The third would include the bog edge of Livingstone Island and that of the opposite Rain Forest, with the famous Rain Forest proper, and Knife Edge, where *Eugenia cordata* predominates."<sup>1</sup> To make its timber durable, water-seasoning is necessary. For illustration see "Forest Flora of Cape Colony," p. 226, Plate LXXI. fig. 3.

**E. guineensis** (= *Syzygium guineense*, Guill & Perr, Fl. Seneg. I. 315, t. 72). *Vern. names*—6, Kurre or Mkurre; 10, Muti kurru or Mokosa; 11, Morimonico. A large glabrous glaucous tree, 10-15 metres high and up to 1 metre diameter. Leaves ovate-acuminate, petiolate, not cordate, usually tapering to the petiole. Panicle 15-25 c.m. across, many-flowered, terminal. More common than *E. cordata* in the tropical districts and often found inside the forest near streams; in the extra-tropical districts it is present but less common. The general habit is similar to *E. cordata*, but the leaf-form is different. *E. owariensis*, P. Beauv.

<sup>1</sup> Linn. Soc. Jour. Botany, XXXVII., Nov. 1906.

**E. Zeyheri**, Harv. *Vern. names*—4, Kangelá; 13, Isiduli-we-hlati. A small evergreen forest tree, with numerous somewhat scented, opposite, elliptic, entire, coriaceous, shining leaves, 2.5-4 c.m. long, slightly dotted, at length quite glabrous, but at first very sparingly pubescent. Peduncles axillary, opposite, 1-flowered, arranged toward the base of the young shoots, or through the partial or complete abortion of the twig apparently ranged on a short 6-12 flowered raceme. Sepals 4-5 more or less unequal. Petals white, usually 4, with occasionally several smaller ones extra. Stamens about 20, as long as the petals, in a circle. Ovary inferior, bedded in a flat cushion-like disc, which is set with white hair-scales. Fruit 1-2 c.m. long, globose, cherry-like, crowned by the calyx-lobes, and either purplish or bright red, acidulous and edible, though containing too large a stone. Present but not frequent from Maputa to M'Chopes, much more frequent in Cape Colony and Natal. For illustration see "Forest Flora of Cape Colony," p. 226, Plate LXXI. fig. 1.

**E. capensis**, Harv. *Vern. name*—4, Ngoba. A shrub 1-2 metres high, usually on or near the sea-dunes, and standing on the sandy dune faces down to high-water mark. Leaves shortly elliptical, obovate or sub-orbicular, rounded at the point, rounded or cordate at the base, coriaceous, glabrous, shining, 15-25 m.m. long, 8-16 m.m. wide, very shortly petioled, and opposite or occasionally in threes. Peduncles 10-12 m.m. long, axillary, 1-3 together, 1-flowered, produced on old or young wood. Petals white. Fruit purplish, 1 c.m. long, oblong crowned by the 4 distinct calyx-lobes, not edible. Of some importance as a dune-protector, but of no other known use. See "Forest Flora of Cape Colony," page 227, Plate LXXI. fig. 2. Abundant on the sea dunes up to Inhambane; frequent also on the Cape Colony and Natal coasts.

138. **BARRINGTONIA**. Only one species, as under:—

**B. racemosa**, Blume. *Vern. names*—4, Singwaan; 6, 7, Geroma; 10, Mlulu, M-togo-togo, 1-tobo-tobo, or Mu-tabo-toba; 11, Mutof. A conical or spreading tree, 7-10 metres high, with dense heavy foliage and long pendent racemes, and always growing in or near water, which may be either fresh or somewhat saline. Leaf like that of the Loquat, 15-30 c.m. long, 5-10 c.m. wide, widely-lanceolate-oblong, tapering below, bluntly pointed, and bluntly toothed on the margin. Raceme 50-75 c.m. long, many-flowered; flowers in opposite pairs; calyx-tube ovoid, limb 4-lobed; petals 4; stamens many, connate at the base, forming a ring, and with white spreading filaments 4 c.m. long; ovary 2-4 celled; fruits produced several on 1 raceme, shortly peduncled, 4-5 c.m. long, 2.5-3 c.m. diameter, bluntly 4-sided, ovate, and crowned by the persistent 4 sepals and 5 c.m. pistil. Seed solitary, but pendulous from a strap-shaped placenta rising from the base and bearing several other abortive ovules. Frequent in swampy localities and along fresh or nearly fresh rivers throughout the Province. The bark is used for cordage. Timber white, soft, light, seldom used.

PLATE LXVIII. 1, Leaf; 2, Raceme; 3, Fruit; 4, Section of fruit; 5, Placenta, with ovules; 6, Tree, general aspect (reduced).

#### FAMILY XXXIV.—LYTHRACEÆ.

Trees, shrubs or herbs; calyx-lobes valvate, with or without intermediate teeth. Petals often corrugated in bud; stamens definite or indefinite; ovary free or partly adherent to the calyx-tube, several or many-celled; cells usually with many ovules. A heterogenous group, including only one tree in the Province, so far as I know.

139. **SONNERATIA**. A departure from the type of the Family in having indefinite stamens and the ovary partly adherent to the calyx-tube. Only one African species as under:—

**S. acida**, Linn. *Vern. names*—10, Mucatanga, Mevate. A shapely glabrous evergreen tree or bush, inhabiting tidal mud, frequent from Beira northward, and having opposite, decussate branches swollen at the nodes; opposite oval leaves 7-10 c.m. long, 5 c.m. wide, tapering somewhat to the base, and firmly coriaceous; and large terminal flowers, solitary or 3 together, at first shortly bracted. Calyx leathery, 6-7 fid, lobes 3-4 c.m. long, 1 c.m. wide; petals absent in the flowers examined, probably caducous, described as "strap-shaped,  $\frac{3}{4}$  length of the lobes of the calyx." Stamens numerous, inflexed in bud; ovary adherent to the calyx-tube at its base only, flattened, many celled; ovules numerous in each cell. Style slender, 4 c.m. long, usually bent, and with a flat rayed stigma. Fruit 5 c.m. diameter, 3-4 c.m. deep, woody, set in but free from the persistent calyx and tipped by the persistent style. "Fruit bursting irregularly from the base, leaving the central axis attached to the calyx. Seeds 6-7 in each cell, radiating from the centre of the fruit. Cotyledons oily."

PLATE LXV. 1, Flowering branch; 2, Flower, opening; 3, Pistil; 4, Anther,  $\times 5$ ; 5, Stigma,  $\times 5$ ; 6, Ovary,  $\times 2$ ; 7, Section of same; 8, Fruit; 9, Ovule,  $\times 10$ ; 10, Seed; 11, Seed broken across, showing germ; 12, Tree, general aspect (reduced).

Another evergreen tree belonging, I believe, to this Family, grows on the sand dunes along the coast north of the Polana bathing station, apparently indigenous; neither flowers nor satisfactory fruits were seen, but I believe it to be a *Lagerströmia*; if so it is probably a naturalised alien.



**CALYCIFLORÆ. GROUP II. SECTION 3.**

Calyx-tube adnate to the base of the ovary, or free. Ovary 1-celled; stamens isomerous and opposite the petals, or more numerous.

**FAMILY XXXV.—SAMYDACEÆ.**

Trees or shrubs with alternate distichous simple leaves, dotted with spots or pellucid glands, racemose or crowded inflorescence and hermaphrodite flowers having the characters described for the Section. A mixed group, of which only 2 ligneous species are known to occur in the Province.

140. **CASEAREA.** Trees with alternate distichous simple dotted leaves. Calyx 4-5 merous; petals none. Stamens 10 fertile and 10 alternate staminodes; filaments united below into a tube. Ovary free, 1-celled; style simple; ovules numerous. Stipules minute. Flowers tufted, small.

**C. gladiiformis**, Mast. A tree found at Shupanga, Zambesi, by Sir John Kirk, having lanceolate leaves 12-15 c.m. long, 5 c.m. wide, oblique at the base and with a 2 c.m. petiole. Flowers in sessile lateral clusters. Filaments united half-way; fertile filaments glabrous; staminodes downy.

141. **BIVINIA.** A shrub with alternate distichous stipulate stalked entire leaves, axillary racemose inflorescence; sepals 5-6; petals absent, stamens numerous, in bundles alternating with the sepals; disc produced to 5 lobes opposite the sepals. Ovary free, 3-lobed, 1-celled; ovules numerous on 4-6 parietal placentas. Styles 4-6. Capsule 4-6 valved; seeds hairy, albuminous.

**B. Jauberti**, Tulasne. Shrub. Young branches downy; leaves ovate or ovate-lanceolate, 7-10 c.m. long, 3 c.m. wide, crenate-dentate, petiolate. Racemes axillary, erect; flowers numerous. Ovary globose, downy; capsule 3-lobed, downy, dehiscent, valves terminated by 2 awns from the splitting of the styles. Rovuma River.

**CALYCIFLORÆ. GROUP II. SECTION 4.**

Ovary inferior. Ovules solitary in each cell. Seeds albuminous. Styles free. Stamens isomerous and alternate with the petals.

**FAMILY XXXVI.—UMBELLIFERÆ.**

Flowers 5-merous, regular or the outer petals larger; stamens 5; ovary 2-celled, inferior; styles 2; ovules solitary, pendulous; carpels dry, 2-seeded, separating into 2 indehiscent 1-seeded carpels, which remain attached to the top of the halves of a split central axis. Albumen fleshy, abundant. Leaves alternate, sheathing at the base of the petiole. Inflorescence in regular umbels. Stems usually hollow. Petals inrolled during aestivation, often emarginate, usually white. A large group of mostly herbaceous plants, of which only 1 local species assumes tree form.

142. **HETEROMORPHA.** Umbels compound; calyx-limb represented by 5 teeth. Petals 5, entire, inserted near the top of the ovary. Stamens 5, alternate to the petals. Fruit smooth, the 2 mericarps unequal, 1 having 3-winged ridges and the other only the 2 side ridges winged. The genus contains only 1 variable species.

**H. arborescens**, Ch. & Sch. *Vern. names*—6, Nutchaka; 10, Mororonge; 13, Umbangandhlala. An exceedingly variable plant; often a small shrub or almost an herbaceous plant with simple ovate or oblong entire blunt leaves; other plants have lanceolate acute leaves; others 3-foliate leaves with obovate-crenate leaflets, and in others the leaves are many-foliate, and the plant quite tree-like. The timber is however always soft and useless. All the varieties mentioned occur in the Province as also in Cape Colony and Natal, and the species occurs also in the Upper Nile and Abyssinia.

**FAMILY XXXVII.—ARALIACEÆ.**

Floral characters almost as in Umbelliferae, but flowers constantly regular, petals valvate in aestivation, fruit more or less fleshy, and the stipulate leaves digitately 5-7-9 foliate, while the inflorescence is often not umbellate.

143. **CUSSONIA.** Rather small trees having soft-wooded somewhat succulent stems of large diameter for their height, spicate racemose or umbellate inflorescence, small green regular 5-merous hermaphrodite or polygamous flowers, inferior 2-celled ovaries with pendulous single ovules, 2 styles, and somewhat fleshy 2-celled fruits. Leaves digitate or repeatedly so, usually crowded at the points of the branches. The habit of *Cussonia* is very distinctive among African trees and it is often mistaken for a Palm though very different.

**C. spicata**, Thunb. *Vern. names*—1, Cabbage Tree; 6, Tsichonga; 10, Nenungo; 13, 15, Umsenge. A tree 6-10 metres in height, 30-45 c.m. diameter, often branched from the base or branched considerably above. Leaves crowded toward the points of the branches, dark-green, glabrous, digitately 5-9 leaved, the leaflets exceedingly variable in form, sometimes simple, lanceolate and toothed, but more frequently with foliaceous winged toothed petioles 7-15 c.m. long, the leafy part 3-7 c.m. wide at the top, ending abruptly and surmounted by 1-3-5 secondary lanceolate or obovate petiolate leaflets, and sometimes this is repeated. Spikes 10-20 forming a common umbel, each spike naked below but with 8-15 c.m. of dense many-flowered rachis, 2-5 c.m. or thereby in diameter (flowers included). Calyx-teeth minute; petals 5, epigynous; stamens 5, alternate to the petals; styles usually 2, spreading; ovary usually 2-celled. Seen occasionally, but rarely, in M'Chopes and in Magenja da Costa, more frequent in the Lebombo Range, and plentiful in Natal and Cape Colony. For illustration see "Forest Flora of Cape Colony," page 230, Plate LXXIV.

**C. Kirkii**, Seem. A tree up to 9 metres high, with 7-9 foliate digitate leaves, "the leaflets narrowly oval-lanceolate, acuminate or cordate at the apex, cuneate to a sessile base, crenulately serrulate, 9-16 c.m. long. Spikes 20 c.m. long, slender, numerous from among the leaves; axis of spike densely covered with small flowers near the top, less dense downward, and absent from the base, scattered with small branched hairs; Moramballa. 100-3000 ft. alt. Dr. Kirk."

### SERIES III.—COROLLIFLORÆ.

Calyx and Corolla usually both present; petals united into a gamopetalous corolla, either hypogynous or epigynous. Stamens usually springing from the corolla, but occasionally hypogynous.

### COROLLIFLORÆ. GROUP I. Ovary inferior.

### FAMILY XXXVIII.—RUBIACEÆ.

Trees, shrubs, or herbs, with opposite, or verticillate entire, simple, stipulate leaves. Inflorescence various. Flowers regular, bisexual, polygamous or dioecious. Ovary inferior, usually 2-celled (1 celled in *Gardenia*, more than 2-celled in *Vangueria*); ovules 1 or more. Calyx-limb 4-6 lobed, corolla monopetalous, 4-6 lobed, epigynous. Stamens inserted in the corolla-tube, alternate with its lobes, and equal in number. Anthers free. Style single below. Fruit various. Seeds albuminous. A large Family, of which the herbaceous species belong mostly to the temperate regions and the trees to the tropics and sub-tropics. Quinine, Coffee and Ipecacuan are among the products of the Family and such garden plants as *Gardenia*, *Ixora*, *Bouvardia*, *Rondeletia*, *Manettia*, *Burchellia*, *Pavetta*, *Webera*, &c., belong to it. It is not much noted for timbers, and the local representatives with the exception of *Adina* and *Gardenia* are mostly shrubs rather than trees; as they hardly deserve mention here from their forestal importance they are only mentioned with synoptical descriptions.

144. **ADINA**. Flowers arranged in pedunculate axillary compact or confluent globular heads, each head on a common bracteolate receptacle. Fruit a 2-celled capsule, bursting apart either from below or above, the central placenta remaining in position supporting the remains of the flower; seeds many, small, winged at both ends. Only 1 African species.

**A. microcephala**, Hiern. *Vern. names*—1, Wild Oleander; 3, Mingerhout; 4, Mhlume; 10, Mahonhe. A large and valuable timber tree, always growing near streams, and so like Oleander in foliage as to lead to the common name. Leaves in whorls of 4, shortly petioled, 15-30 c.m. long, 2-5-3-5 c.m. wide, lanceolate, glabrous, with prominent midrib, and numerous side veins. Stipules intra-petiole, 4 united below, and dehiscing in a ring. Head 12 m.m. diameter on a 5 c.m. peduncle, with many-flowered, congested, the common receptacle hairy, each flower set between 5 club-shaped bracts which are hairy below; the calyx with a short tube, and 5 longer lanceolate segments; the corolla with a longer tube and 5 short segments. Stamens 5, inside the corolla-tube. Style twice as long as the corolla, with a club-shaped stigma. First-rate wagon-wood for spokes, beams, &c.; stem sometimes 3 metres diameter in Swaziland and Eastern Transvaal, in creeks and gullies on white granite. Frequent in Magenja da Costa and Nhamacurra (Tropical); seen also Umbelusi and in the Lebombo kloofs near Estatuene, Maputa Div. (Extra-tropical). Occurs also in Nile-land. Mr. Burt Davy writes (Kew Bulletin No. 4, 1908):—"The Transvaal material at Kew so named is now referred to *A. Galpini*, Oliv.," of which I have no further information.

PLATE XXXI. 1, Fruiting branch; 2, Flower; 3, Floral bracts; 4, One floral bract; 5, Capsule, opened from below; 6, Capsule, opened from above.

145. **CROSSOPTERYX.** Unknown to me but described as a bushy tree or shrub having dense corymbosely paniculate terminal inflorescence, calyx short, with 4-6 deciduous lobes; corolla salver-shaped, with 4-6 lobed limb; stamens 4-6, inserted at the throat of the corolla; disc annular; ovary 2-celled; style filiform; stigma clavate, bi-lobed; cells with several ovules peltately attached. Capsule globose, 2-celled, loculicidal. Seeds several, peltate, compressed, with cut membranous wings.
- C. Kotschyana**, Fenzl. Leaves broadly oval, ovate or elliptical, 2.5-20 c.m. long, 1.5-7 c.m. wide, shortly petiolate. Panicle 5-10 c.m. diameter. Corolla 1 c.m. long, white, fragrant. Capsule 1 c.m. diameter. Senna; Sir John Kirk; and widely distributed in Tropical Africa. The bark is said to be employed as a febrifuge.
146. **HEINSIA.** Shrubs with opposite shortly petiolate leaves, and fragrant flowers in lax terminal cymes. Corolla imbricated in bud. Ovary 2-celled, cells many-ovuled. Fruit dry, indehiscent, many-seeded, seeds small, roundly angular.
- H. jasminiflora**, D. C. A nearly glabrous shrub 2-5 metres high, found from the Zambesi northward. Leaves elliptical, 3-10 c.m. long, 1-4 c.m. wide; corolla-tube pubescent, 2 c.m. long, limb white, 2-6 c.m. diameter with yellow hairs and wavy petals. Berry 1-1.5 c.m. diameter.
147. **TARENNA.** Shrubs or trees with opposite shortly petiolate leaves and white flowers in terminal or sub-terminal cymes. Flowers 5-6 nate; calyx open in aestivation. Corolla salver-shaped, style long, clavate; ovary 2-celled. Placentas large and fleshy, albumen uniform.
- T. mossambicensis**, Hiern. *Vern. name*—16, Goocoo. A tree with broadly oval leaves 3-5 c.m. long, 3-4 c.m. wide, glabrous above, pale under, and pubescent on the veins below. Cymes few-flowered. Flowers 5-merous, 1 c.m. long; corolla pubescent outside, glabrous inside; ovary pubescent, 2-celled; ovules 4 together, bedded in the fleshy placentas. Zambesia.
- T. nigrescens**, Hiern. Leaves lanceolate or oval, tapering below, 3-7 c.m. long, 1.5-3 c.m. wide, glabrous; flowers 4-5 merous, 1 c.m. long; cymes many-flowered. Ovules 3 together. Zambesia.
148. **ENTEROSPERMUM.** A glabrous rigid coast shrub with opposite leaves, and terminal corymbose panicles of small white flowers. Flowers 5-nate; calyx open in aestivation; corolla funnel-shaped; style exserted, clavate; ovary 2-celled; ovules 2-3 together, collateral; placentas inconspicuous. Fruit globose, 1-seeded.
- E. littorale**, Hiern. A leafy coast shrub, up to 4 metres high, with decussate oval or obovate leaves 3-9 c.m. long, 1-4 c.m. wide, with hairy tufts in the axils of the veins. Flowers 4-6 m.m. long. Fruit 6 m.m. diameter. Along the coast in the tropical districts.
149. **RANDIA.** Shrubs or trees with opposite or whorled leaves, and sparingly cymose or solitary inflorescence, axillary or terminal on short branches. Calyx open in aestivation, corolla usually 5 (4-7) lobed, of various form. Ovary 2-celled; ovules numerous, immersed in the fleshy placentas. Berry nearly dry, 2-celled, many-seeded.
- R. rudis**, E. Mey. *Vern. names*—10, Um-totoro; 13, Nsindi. A much-branched compact spreading shrub 1-2 metres high if growing in the open, but more erect and straggling if growing among other bushes. Leaves opposite on strong shoots, clustered on abortive branches, obovate, coriaceous, evergreen, entire, almost glabrous, shortly petiolate; when fully exposed smaller and nearly round. Flowers axillary or on the abortive twigs, peduncles short, 1-flowered. Calyx-tube short, the 5 lobes longer, rounded, green. Corolla-tube 1-5 c.m. long and wide above, narrowed downward, yellowish with 5 oblong lobes. Style single, stigmas 2; fruit a coriaceous, sub-globose 10-ribbed black berry 12 m.m. long, 2-celled, many-seeded, and crowned by the calyx-limb raised on a short tube. Frequent in the extra-tropical districts; present but scarce in Magenja da Costa and other tropical districts. Frequent also in Cape Colony and Natal, never of timber size. See "Forest Flora of Cape Colony," p. 236, Plate LXXXIV. fig. 4.
- R. dumetorum**, Lam. *Vern. name*—4, Cherole. A pubescent or hairy or ultimately glabrescent shrub 1-4 metres high, sometimes somewhat spinose, and having obovate leaves 3 c.m. long, 2 c.m. wide, tapering to the base, inflorescence axillary or terminal on branchlets, abundant, at first white, afterwards yellow, 2 c.m. across, and 1 c.m. long. Ovary 2-celled, many-seeded, oblong, 2 c.m. long, 1.5 c.m. wide, not edible. Frequent throughout the Province; also in Natal and Abyssinia. For illustration see "Natal Plants," Plate 392.
150. **OXYANTHUS.** Shrubs or trees with rather large opposite simple stipulate leaves and long white flowers in axillary racemes or panicles. Flowers 5-nate, calyx-lobes open in aestivation, corolla salver-shaped with a long slender tube, the long linear segments twisted in bud. Ovary 2-celled, style slender, stigma 2-lobed; ovaries numerous, not immersed; fruit a leathery or fleshy berry, seeds usually numerous.



**O. Gerrardii**, Sond. *Vern. name*—4, Chifilana. A virgate shrub or small tree with straight slender stems. Leaves 10-20 c.m. long, opposite, shining, coriaceous, entire, elliptic-lanceolate, pointed, glabrous, but bearded in the axils of the veins on the under surface, shortly petiolate. Inflorescence axillary, shortly paniculate, 12-20 flowered. Tube of the corolla 2.5-4 c.m. long, slender, with spreading lanceolate lobes 1.5-2 c.m. long. Fruit coriaceous, stalked, somewhat pear-shaped, 4 c.m. long, crowned by the calyx-teeth, 2-celled, many-seeded. Found occasionally throughout the Province. For illustration see "Forest Flora of Cape Colony," p. 235, Plate LXXXII. Occurs also in Cape Colony and Natal.

**O. natalensis**, Sond. *Vern. name*—6, Madungnadwaan. Small tree with ovate-lanceolate glabrous leaves 15-20 c.m. long, 7 c.m. wide; loose axillary cymes; corolla-tube 7 c.m. long, slender with spreading lobes, and nearly globose fruit 2-3 c.m. long, 2-celled, many-seeded. Maputa, Gaza and M'Chopes. For illustration see "Natal Plants," Plate 26.

**O. latifolius**, Sond. *Vern. name*—10, Masabelemo. Leaves ovate-cordate, cuspidate, 15-20 c.m. long, 10-12 c.m. wide, with a petiole 1 c.m. long; inflorescence lax; corolla-tube 7 c.m. long. The leaves, branches, &c. are described by Sonder as quite glabrous, but I find them pubescent at first, the upper surface of the leaf glabrous or glabrescent with age. Maputa, M'Chopes and Magenja da Costa; an upright shrub 3-6 metres high.

151. **GARDENIA**. Trees and shrubs, mostly tropical and sub-tropical, with opposite or occasionally whorled leaves and branches, connate stipules, and solitary or occasionally cymose sub-terminal inflorescence, and large white scented flowers. Calyx tubular above the ovary, 5-lobed or parted, or spathaceous. Corolla salver-shaped, funnel-shaped or bell-shaped, with a tube longer than wide and 5-10 parted limb, the segments twisted in bud. Stamens as many, almost sessile, inserted in the throat of the corolla-tube. Anthers linear, more or less twisted. Style as long as the tube or longer, stigma clavate, 2-fid. Ovary 1-celled with several incomplete septa. Fruit woody or fleshy, 1-celled, many-seeded, indehiscent. Seeds large, flat, with horny albumen. A large genus, containing several species which are garden favourites.

**G. Rothmannia**, Linn. *Vern. names*—1, Candlewood; 10, Mataba; 14, Aapse-kost. A tree often 12-15 metres high, 20-40 c.m. diameter, with a straight unbranched, grey or nearly white trunk, and a sparingly branched crown near the top only. A forest tree, loving a moist spot, and not known outside the forest. Leaves almost sessile, elliptical-acute, entire, glabrous, 7-10 c.m. long, 2.5 c.m. wide, distinctly veined, and with pockets at the junctions of the veins. Flowers terminal, solitary, sessile, showy and sweetly scented, but usually inaccessible. Calyx ribbed, hairy within, and with 5 linear segments 2.5 c.m. long. Corolla white, 5-7 c.m. long, widening upward, and with a spreading 5-fid limb 7 c.m. across. Pistil clavate, longer than the tube, 2-fid at the apex. Fruit 1-celled, 2 inches long, at first 5-angled, afterwards 10-ribbed, many-seeded, green; the flat seeds separated by pith. Rind hardly woody, not edible. Timber very hard and close-grained, but short in the grain. For illustration see "Forest Flora of Cape Colony," p. 234, Plate LXXIX. Occurs in Maputa on the Lebombo kloofs and in M'Chopes (extra-tropical), as also in Magenja da Costa near Macubella, and in Nhamacurra (tropical).

**G. Thunbergia**, Linn. *Vern. names*—1, Wild Katjepiering; 3, 14, Buffelsbal; 4, Chiselala and Imbalangwe; 10, Nepaia and i-tirigo; 13, Umkangaza; 15, Vala sanguin (Kaffaria) and Um-valasangwaan (Natal). A small much-branched tree 3-5 metres high, with smooth white unarmed stem up to 30 c.m. diameter, and rigid opposite or ternate branches and branchlets, or sometimes prostrate or mostly subterranean. Leaves very variable, lanceolate on seedlings for the first few years, afterwards ovate, obovate, or widely elliptical, tapering to the base, rounded or acute, entire or with one or more irregular lobes or teeth, glabrous, veined, and bearded in the axils of the veins. Leaves opposite or 3 together, shortly-petioled. Flowers terminal, solitary, strongly scented, usually 8-merous, large, white and attractive. Calyx green, foliaceous, 4-5 c.m. long, cleft on 1 side, and with 5-10 shortly-stalked, unequal, leaf-like lobes. Corolla salver-shaped, 8-lobed, the tube 8-10 c.m. long, 1 c.m. diameter, the limb 7-10 c.m. across, pure white and regular. Stamens about 8, exerted, twisted; stigma exerted, 2-lobed. Fruit woody, very hard, oval or oblong, 5-10 c.m. long, 5 c.m. diameter, many-seeded, crowned by the large calyx-scar and with about 5 (or sometimes up to 10) imperfect dissepiments. The fruits remain on the trees for several years, increasing in size, and finally are either smooth or rugose, but usually white. An exceedingly variable species, possibly including several species, though I have not noticed what I should consider specific differences either in Cape Colony, Natal, or this Province, in all of which it is widely distributed, but nowhere plentiful. In the Journal of the Linn. Soc., Botany, Vol. XXXVIII., No. 268, Feb. 1909, Dr. Otto Stapf and Mr. J. Hutchinson give a monograph of the forms included in the group which has hitherto passed as this 1 species; they make it into 15 species and say finality has not yet been reached. About half of these species are recorded from this Province, but the monograph arrived too late to allow me to use it on the fresh plants, consequently no attempt is made to divide this species here. The forms mentioned as

belonging to this Province are *G. subacaulis*, S. & H. ; *G. Jovis-tonantis*, Hiern ; *G. Thunbergia*, Linn. (with limited characters) ; *G. Saundersiae*, N. E. Brown, in Kew Bull. 1906, p. 104 ; *G. asperula*, S. & H. ; *G. cornuta*, Helms. in Hook. Icon. Pl. t. 2809 ; *G. spathulifolia*, S. & H. For illustration see "Forest Flora of Cape Colony," p. 234, Plate LXXVIII.

**G. resiniflua**, Hiern. From Lake Nyassa and the Zambesi, is described as an hispidulous or scabrid bush of 4 metres height with resinous secretion ; branches often ternate ; leaves obovate, cuspidate 2.5-6 c.m. long, 2-3 c.m. wide. Flowers solitary, terminal, about 2.5 c.m. long, 5-merous ; calyx 1 c.m. long, with sub-globose tube ; corolla salver-shaped, fragrant ; lobes oval, 1 c.m. long, white turning yellowish ; fruit globose, 8-12 m.m. diameter with 2 placentas.

**G. manganjæ**, Hiern. A glabrescent shrub from Zambesia with elliptical sub-acuminate leaves 7-10 c.m. long, 2.5-5 c.m. wide ; solitary flowers 5-7 c.m. long, on short lateral branches ; funnel-shaped corolla shortly hairy on both sides ; the corolla-limb 3.5 c.m. diameter. Placenta solitary.

**G. Annæ** (P. Wright) var. *Moramballæ*, Hiern. Leaves elliptical-acuminate, 7-13 c.m. long, 2-4 c.m. wide, with a wedge-shaped base and bearded vein-axils. Flowers about 7 c.m. long, solitary, sub-sessile, scented ; calyx 2 c.m. long, glabrous, shaggy inside ; corolla funnel-shaped, tube hairy inside, limb 5 c.m. across ; ovary oblong with 2 placentas. Zambesia.

**G. (?) Zaquebarica**, Hiern. Described as a glabrous shrub with elliptical, sub-acuminate, shortly-petiolate leaves, 7-12 c.m. long by 3-4 c.m. wide, ovate-acuminate stipules 1 c.m. long, covering a ring of hairs inside the base, "flowers more than  $\frac{1}{2}$  inch long, sub-sessile, a few together, in terminal and quasi-axillary short clusters. Calyx-limb 5-partite,  $\frac{1}{8}$  in. long ; lobes lanceolate, acuminate. Ovary 1-celled ; placentas 2." This tree or shrub was described from further north, but a common small tree in the forests of Magenja da Costa of which my material is insufficient may belong to it, or to an allied undescribed species. It has the inflorescence rusty pubescent, in short 10-20 flowered cymes terminal on side branches ; leaves as described above but pubescent on the veins underneath ; calyx in bud with 5 subulate erect segments 2 c.m. long ; fruit globose, 3-4 c.m. diameter scurfy-brown, 1-celled, many-seeded, the seeds bedded in pulp and showing in the mature fruit no indication of how many placentae are present ; the fruit crowned by the persistent calyx-tube and segments, then wider and less subulate than when young. *Vern. names*—10, 11, Masabwe, Nasaque or Naseka, Egamsago, and Nemagubula. Sim 6069. The timber is used by natives for making plates, &c.

Another shrub, known at Lourenço Marques as Nyamafaan, is probably also a *Gardenia*, but was not seen in flower or fruit.

152. **ZYGOON**. A shrub from Zambesia unknown to me but described as having opposite elliptical shortly-petiolate rather velvety leaves, ovate apiculate-acuminate stipules, and white, odorous, sub-precocious, small sessile hermaphrodite flowers crowded in dense lateral clusters. Calyx campanulate-turbinate, 5-lobed ; corolla funnel-shaped, glabrous outside, bearded at the throat ; ovary 2-celled, ovules 2-3 together, collateral, pendulous from the apex ; style filiform wider and undivided or bidentate at the tip.

**Z. graveolens**, Hiern. Young parts rather velvety ; leaves 3-4 c.m. long, 1.5 c.m. wide, turning blackish-green when dry ; flowers 4 m.m. long, corolla-lobes 4 m.m. long.

153. **TRICALYSIA**. A group characterised by opposite stipulate, entire, evergreen leaves, axillary cymose inflorescence, 4-5-6 merous flowers, corolla funnel-shaped or salver-shaped ; style with 2 branches, ovary globose, 2-celled with few ovules in each, and baccate globose mostly 2-seeded fruits. Within this group are included the following sub-genera, viz. :—*Diplospora*, flowers 4-merous ; *Kraussia*, flowers 5-merous, and *Tricalysia*, flowers 6-merous. They are mostly erect or straggling shrubs 1-3 metres high, known as *Wild Coffee* and closely resemble *Coffee* in habit ; there are many species of no technical value, and these are therefore not described separately here. In the "Flora of Tropical Africa" 21 species are described ; in "Flora Capensis" other 4, and there are others besides. In "Forest Flora of Cape Colony" illustrations are given on Plate LXXXV. of *Diplospora africana*, Sim (fig. 3) ; *Kraussia lanceolata*, Sond. (fig. 1), and *Tricalysia capensis* (fig. 4). Native names included in this group are :—4, Nakaranga or Nukajanga ; 6, Rutatsakanye ; 10, Ugatadwe and Manyeba-gorewa ; 15, Patankos.

154. **PSYCHOTRIA**. Shrubs or small trees, having opposite entire leaves, corymbose-paniculate terminal inflorescence, 5-merous flowers, stamens included in the tube, 2-celled ovary with solitary erect ovules, and globose 2-seeded fruits, the seeds flat on the adjacent faces, and with more or less ruminated horny albumen. A large genus, represented in most tropical and sub-tropical countries.

**P. capensis**, Vatke. *Vern. names*—4, Kumukuwa and Indulwane ; 13, Gono-gono (*Kafraria*), i-boquongo (Natal). Usually a shrub, sometimes a tree up to 3-5 metres height with 7-15 c.m. stem diameter and with crooked and forked timber. Leaves evergreen, shining above, paler below, widely lanceolate, elliptic or obovate-oblong, 7-15 c.m. long, 1.5-4 c.m. wide, shortly petioled, distinctly veined, rounded at the apex or bluntly pointed, glabrous above and either glabrous or pubescent below.

Panicles few or many-flowered, terminal, trichotomously forked, 2.5-10 c.m. across. Flowers dimorphic on different trees. Calyx-tube short, minutely 5-toothed. Corolla yellow, shortly tubular, with 5-parted limb and a hairy throat. Stamens in the throat of the corolla-tube, with shortly oblong anthers. Pistil bifid. Berries numerous, reddish, 6 m.m. diameter with only a scar where the calyx has been. Stipules shortly ovate from a broad base, bluntly pointed. For illustration see "Forest Flora of Cape Colony," Plate LXXXV. fig. 2. Frequent in the southern portion of the Province, as also in Natal and Cape Colony. What was taken for the same species was also seen in Magenja da Costa, but as it was without flower or fruit it may have belonged to one of the other species, which are all unknown to me and of which the descriptions are extracted from the "Flora Capensis."

**P. obtusifolia**, Poir. Glabrous. Leaves obovate, thickly coriaceous, concolorous, 7-13 c.m. long, 3 x 5 c.m. wide; stipules caducous, deltoid, 4 m.m. long; flowers in dense pedunculate corymbose terminal panicles of about 4 c.m. diameter; calyx-limb small, very shortly 5-dentate, not ciliate; corolla lobes ovate; anthers shortly oblong, exserted; fruit oval, 4 m.m. long, ribbed, 2-celled; seeds striate. Mozambique. *Forbes*.

**P. zambesiana**, Hiern. Nearly glabrous; answering the general description of *P. obtusifolia* except that the leaves are smaller (6-9 c.m. long, 2.5 c.m. wide), the calyx teeth ciliate, and anthers nearly included. Kongone mouth of the Zambesi. *Sir John Kirk*.

**P. abrupta**, Hiern. Nearly glabrate. Leaves elliptical, narrowed to both ends, 5-18 c.m. long, 2-7 c.m. wide, or smaller; stipules ovate, undivided, 3 m.m. long. Flowers about 4 m.m. long, on very short pedicels, several together, in small, terminal, sub-capitate heads; common peduncles very short when in flower, lengthening afterwards to 4 c.m. Calyx sub-truncate; corolla-lobes 5, throat bearded; stamens exserted. Zambesia.

**P. Kirkii**, Hiern. Corresponds with *P. abrupta* except that it is more or less pubescent, has smaller leaves (2.5-10 c.m. long, 1.3 c.m. wide) and has the calyx shortly toothed. Flowers dimorphic. Moramballa.

**P. pumila**, Hiern. A shrublet with ovate or oval leaves 6-9 c.m. long, 3.6 c.m. wide, and terminal ebracteolate umbellate heads 1 c.m. diameter. Moramballa.

**P. zanguebarica**, Hiern. A small glabrous lucid shrub, with oval leaves 3-10 c.m. long, 2-3 c.m. wide. Flowers 5-merous 12-16 m.m. long, with a rather curved corolla-tube, and in little clusters arranged in terminal cymes of 2.5-5 c.m. diameter. Rovuma Bay.

155. **GUETTARDA**. Shrubs or trees with opposite leaves, intrapetiolar deciduous stipules, and axillary cymose inflorescence. Calyx campanulate, truncate; corolla salver-shaped, white, 4-9 lobed, imbricate in aestivation. Stamens 4-9, included or nearly so. Ovary 4-9 celled, cells 1-ovuled, style filiform, stigma slightly lobed. Fruit globose, drupaceous, woody, 4-9 celled.

**G. speciosa**, Linn. A handsome coast shrub, well worth cultivation in coast localities on account of its beautiful white scented flowers. Leaves rounded or obovate, 10-25 c.m. long, 6-15 c.m. wide; flowers 3-4 c.m. long, 3 c.m. across; fruit 2-3 c.m. long. Seeds exalbuminous. Along the coast at Bazaruto, Bartholemew Dias, Quelimane, &c.

156. **POLYSPHÆRIA**. Shrubs with opposite elliptical or rounded leaves, supra-axillary stipules, and small flowers sessile in dense axillary clusters. Calyx short, truncate or 4-toothed; corolla funnel-shaped, bearded in the throat, 4-lobed; stamens 4, included; ovary 2-celled; ovule solitary, pendulous. Berry small, globose, coriaceous, 1-2 seeded, albumen ruminated.

**P. multiflora**, Hiern. A glabrous shrub with oval leaves 3-10 c.m. long, 2-3 c.m. wide. Calyx truncate, glabrous. Rovuma.

**P. lanceolata**, Hiern. A glabrous shrub with lanceolate leaves 4-9 c.m. long, 1.5-3 c.m. wide; calyx with 4 short teeth. Zambesia.

157. **PLECTRONIA**. (= *Canthium*, as used in the "Flora of Tropical Africa.") Trees, shrubs or stragglers, sometimes spinose, with evergreen entire stipulate leaves, axillary cymose inflorescence, usually 5-merous flowers, valvate in aestivation, capitate stigma, and 2-celled ovary with a single pendulous ovary in each cell. Corolla-tube more or less hairy inside or with a ring of hairs. The branches are often but not regularly spinescent. A group of shrubs of no forestal importance, of which *P. Gueinzii* is a scandent or trailing shrub common in the southern part of the Province, while several of the other Cape species extend along the Lebombos, and 4 other species are included in the "Flora of Tropical Africa" (under *Canthium*), as belonging to this Province. For illustrations see "Forest Flora of Cape Colony," Plate LXXXVIII., LXXXIX., XC. Vern. names are—6, Ndondambile; 10, Mtagaraga; 4, 13, 15, Umnyushulube,



158. **VANGUERIA.** Shrubs or trees having opposite leaves and axillary cymose inflorescence; calyx-limb of 5 free segments; corolla-tube shortly cylindrical, with a ring of reflexed hairs in the throat; limb rotate, of 5 lobes, valvate in bud. Stamens 5, erect, on short filaments, exserted when the corolla limb is spread. Anthers oblong, pointed. Pistil exserted, style slender, stigma capitate. Ovary 5-celled, with 1 ovule in each cell, attached half up the central axis. Fruit large, containing 5 or by abortion fewer hard bony pyrenes. A difficult group of almost useless shrubs, requiring to be well known in the fresh state as they change the size, form, and pubescence of leaf, as well as general appearance, with age.

**V. infausta**, Burch. *Vern. names*—4, 13, 15, Umfilwa, in-faylo Um-vilo or Mavelo; Penu. A small tree 2-3 metres high, with few and rather thick branches. All younger parts densely tomentose, the upper surface of the leaves becoming scabrid with age. Leaves 5-15 c.m. long, 5-10 c.m. wide, ovate, ovate-elliptical or sub-orbicular, bluntly pointed, and having petioles 1-5 c.m. long. Cymes axillary, forked, many-flowered, 8 c.m. across. Flowers green, calyx-lobes short, triangular, tomentose, caducous, and absent from the fruit. Corolla-tube much longer, tomentose externally, with spreading 5-fid limb. Stamens in the throat of the corolla, erect, oblong, on a subulate filament. Ovary 5-celled, 5-ovuled; fruit about 1 inch diameter, globose, glabrous when nearly ripe, usually some ovules abortive. Abundant throughout the Province; the fruit is eaten by hungry natives. For illustration see "Forest Flora of Cape Colony," Plate LXXXVI. fig. 2.

**V. edulis**, Vahl., which is somewhat similar except that it is almost glabrous and has the leaves acute at both ends, occurs in other parts of Tropical Africa, including Rhodesia and Transvaal, and may occur here though not found by me, or recorded.

**V. venosa** (as used in "Forest Flora of Cape Colony," page 244, Plate LXXXVII. fig. 1). *Vern. names*—4, Mehofelwane; 10, Mseruru and Mjulu; 13, Umvilo-wehlati. An erect shrub 2-5 metres high; leaves 3-8 c.m. long, green above, pale below, usually with scabrid white-pubescent petioles, veins, stipules, and young twigs. Cymes 3-7 flowered, sparingly and irregularly pubescent, as also is the calyx. Calyx-tube 2 m.m. long, lobes 10-12 m.m. long, 2 m.m. wide in flower, wider in fruit. Corolla tube 5 m.m. long, glabrous externally, and with a ring of reflexed white hairs 2 m.m. long on the inner surface below the stamens. Lobes triangular, twisted in aestivation into long narrow points. Ovary 5-celled, ovules mostly fertile. Stipules linear from a deep ring which has long white hairs inside. The fruit is considered edible by the natives. Frequent throughout the Province.

**V. euonymoides**, Schw. A nearly glabrous shrub 3-7 metres high, with oval leaves 2-7 c.m. long, 1-3 c.m. wide; cymes few-flowered; calyx truncate; fruit 3-5 celled, 1 c.m. diameter. Lourenzo Marques.

**V. velutina**, Hiern. A tomentose shrub, having oval leaves 3-8 c.m. long, 2-4 c.m. wide; flowers in very condensed panicles, tomentose outside, crowded in lateral clusters. Fruit fleshy, globose. Zambesia.

Several other small shrubby species of *Vangueria* or *Fadogia* (which differs only in having whorled leaves) occur in the Province.

159. **IXORA.** Glabrous shrubs or small trees with opposite evergreen leaves, terminal corymbose panicles, and coriaceous berries with 1 or 2 seeds. Flowers 4-merous, corolla salver-shaped with slender tube, anthers partly included, ovary 2-celled, style slender, 2-branched at the apex, ovules solitary, peltate; seeds convex on the back, concave on the front, albuminous.

**I. odorata**, Hook. "Leaves oval ohlong, acutely acuminate, coriaceous, the lower ones 4-8 by  $1\frac{1}{4}$ - $2\frac{1}{2}$  inches or more, and rounded at the base or narrowed into the robust petiole of  $\frac{3}{8}$ - $\frac{3}{4}$  in., the upper ones as well as the bracts smaller, ovate rounded or emarginate at the sessile base, lateral veins about 9-12 pairs, inconspicuous; stipules ovate, apiculate, appressed, connate at the base,  $\frac{1}{6}$ - $\frac{1}{4}$  in. long. Flowers white, fragrant, three together, sub-sessile, 2-3 in. long, many, in terminal dense trichotomous corymbose panicles of 4-10 in. diam. bibracteolate at the base; bracteoles subulate, small, the uppermost at the base of the calyx; peduncle 1-3 in. long bearing 1-2 pairs of foliaceous bracts. Calyx glabrous,  $\frac{1}{8}$  in. long urceolate; teeth ovate. Corolla-tube slender; limb about 1 inch diam.; lobes oval, obtuse, glabrous. Anthers partly included. Style exserted to half the length of the corolla lobes, bifid at the tip. Fruit  $\frac{2}{3}$  in. diam. Mozambique. *Forbes*."

160. **PAVETTA.** Shrubs or small trees, with opposite entire evergreen leaves, and corymbose or corymbose-paniculate terminal inflorescence of white 4-merous flowers. Calyx-tube cup-shaped, with long or short segments. Corolla with a long slender tube and 4 spreading segments, twisted in bud. Stamens 4, sessile, in the throat of the tube. Style longer than the tube, with clavate emarginate stigma. Fruit 2-celled, 2-seeded, dry, black, globose, crowned by the calyx-lobes. Inflorescence terminal on main and axillary branches.

**P. lanceolata**, Eckl. *Vern. names*—1, Christmas Tree; 10, Mtelagua and Nemavegwe; 13, Umdhlesa; 15, Leza-n-kozasane. A small glabrous tree 7 metres high and up to 20 c.m. diameter; leaves lanceolate or widely lanceolate, 5-10 c.m. long, 2-3 c.m. wide, glossy above and often with bearded pockets underneath in the axils of the veins. Panicle diffuse, corymbose, terminal or on side branches, many-flowered. Calyx-lobes very short, bluntly rounded. Corolla-tube 2 c.m. long. Fruit 5 m.m. diameter. Bark grey; timber white, hard, close-grained. For illustration see "Forest Flora of Cape Colony," p. 237, Plate LXXXIV. fig. 1. Frequent throughout the Province, less abundant in the northern flats.

Several other small shrubby Cape species occur along the Lebombo Range, and in the north two small species are described, viz.:—*P. macrosepala*, Hiern, with oval glabrous leaves, and *P. gracilis*, Klotzsch, with elliptical more or less pubescent leaves.

A curious shrub 2-7 metres high, with thick rigid branches, long croton-like lanceolate leaves 10-40 c.m. long, 2-3 c.m. wide, terminal panicle inflorescence, and round fruits 6 m.m. diameter, occurs in the Lebombo range in Maputa and Marracuene, and also in the more inland portions of Magenja da Costa and Nhamacurra, and appears to belong to *Pavetta*, but my material is insufficient for determination. It is known locally as (15) Hlangushan.

161. **COFFEA**. Shrubs or small trees with opposite leaves and branches, intrapetiolar stipules, axillary or terminal solitary or clustered white fragrant hermaphrodite flowers, and oblong 1-2 seeded berries. Calyx-tube short, toothed, not accrescent; corolla salver-shaped, 5-7 merous, lobes twisted in aestivation; stamens 5-7, partly or wholly exerted. Ovary 2-celled; style filiform, 2-fid; ovules solitary, peltate; berry oblong, pyrenes usually 2, convex on the back, furrowed on the face. Albumen horny. Bracteoles connate into a cup.

**C. stenophylla**, G. Don. *Vern. name*—1, Inhambane Coffee. A glabrous shrub 2-5 metres high, with opposite leaves and branchlets. Leaves lanceolate, elliptic, or obovate, bluntly pointed or varying to candate-acuminate, sub-coriaceous, 5-10 c.m. long, 1-3 c.m. wide. Flowers axillary, 1-3 together, shortly pedunculate; corolla-tube 6 m.m. long, lobes 6-8, oblong; the flower 2-2.5 c.m. across; anthers exerted. Berry oblong, 1.5 c.m. long, black. Frequent in moist parts of the forest from M'Chopes northward, often cultivated, cultivation being started either by moving young plants from the forest, or by burning down the forest when the Coffee is the first tree to start again. *C. stenophylla* has been regarded as a West African species; the East African plant differs slightly in having more distinctly lanceolate leaves, but I think is not specifically distinct. Inhambane Coffee is not however entirely the product of this bush, as other exotic species are cultivated for their seeds, and the distinctive flavour of Inhambane Coffee is probably due as much to treatment as to species. Though less subject to coffee disease than the exotic kinds, the local species is not proof against it, and with the forests full of nearly related Rubiaceous trees all more or less subject to that or closely related fungoid diseases, coffee culture can hardly be regarded as a promising branch of agriculture unless future developments show some easy and cheap method of keeping the pest in hand.

Other species said to be indigenous in the north are:—*C. Zanguebariæ*, Lour., having oval or obovate thin leaves, axillary flowers, and the berries longitudinally nerved; and *C. racemosa*, Lour., having ovate-lanceolate leaves and sub-terminal erect racemes. The cultivated coffee is mostly *C. arabica*, Sim, having oval or elliptical leaves and axillary clusters of flowers.

162. **TRIAINOLEPIS**. Shrubs with pubescent or glabrescent opposite leaves, small tricuspidate stipules, and hermaphrodite small, 5-7 merous flowers having 5-7 celled ovary and solitary erect ovules; the flowers arranged in terminal corymbose cymes.

**T. africana**, Hook. f. Pubescent. Leaves ovate or elliptical, pointed, 6-10 c.m. long, 2-4 c.m. wide; flowers 1 c.m. long, 1-1.5 c.m. across. Rovuma Bay.

A small tree in the forests of Magenja da Costa, known as 10, ikalago, of which I have not seen the flowers, appears to belong to Rubiaceæ and to be not previously included herein, but my material is insufficient for full determination. It has opposite obovate-acuminate leaves 7-12 c.m. long, 3 c.m. wide, firmly pubescent above and on the veins below; young wood pubescent; stipules acuminate from a wide base; panicle 10 c.m. wide and long; fruit globose 5-6 m.m. diameter, having a large areole with 5 short teeth on its margin; fruit 2-celled with 1 peltate flat seed in each cell, each seed having several (4-6) large and beautifully fringed peltate scales upon its surface. These scales are oblong 2-3 m.m. long, and unlike anything of the kind I have seen elsewhere. Sim 601 and 6053.

For *Lepipogon obovatum*, G. Bertol, an Inhambane shrub unknown to me, see "Flora of Tropical Africa," III. 247.

#### FAMILY XXXIX.—COMPOSITÆ.

Flowers in several-flowered or usually many-flowered heads, on a common receptacle, and surrounded by a common involucre; which heads are popularly regarded as separate flowers. Flowers 5-merous, regular or bilabiate, or the inner florets regular and the outer with strap-shaped corolla in the same head. Calyx adherent to the corolla,

and with the limb absent or modified into few or many scales, bristles, hairs or feathered hairs, and known as the *pappus* when surmounting the fruit. Corolla either all tubular, all bilabiate, all strap-shaped, or the inner tubular and the outer strap-shaped in the same head, in the latter case the larger strap-shaped and often coloured outer florets making the resemblance of the head to a flower with these as petals the greater. Stamens 5, filaments distinct, anthers cohering round the style. Stigma bifid. Ovary inferior, 1-celled, with 1 erect ovule, forming an indehiscent 1-seeded fruit, often crowned by a sessile or stalked pappus. Seed exalbuminous. Leaves usually alternate, exstipulate. Flowers perfect, monoëcious or dioëcious; perfect, female and neuter florets being often in 1 head.

The largest Family for the whole world and for most localities, usually represented by herbaceous weeds; in this Province only a very few attain shrub or tree size. Bitterness is the most common principle in the Family; a few, as the lettuce and the chicory, are edible under certain conditions, and many are used in medicine. Garden flowers are numerous, including the Daisy, Marguerite, Dahlia, Marigold, Cineraria, Senecio, Pyrethrum, Sunflower, Aster, Chrysanthemum and Helichrysum.

163. **VERNONIA.** Herbs, shrubs or small trees, with alternate leaves, cymose-panicled inflorescence, and usually many-flowered capitula of white, pinkish or purplish, tubular, hermaphrodite flowers. Style branches slender. Pappus composed of numerous setae. Very diverse in habit and appearance.

**V. senegalensis**, Less. *Vern. names*—4, Pahla-pofu, Pahla-kapfa, Insumbalume, Shirangela-nguba; 10, Mesagulo; 15, Nyatsele. A tomentose much-branched shrub 2-6 metres high, occasionally up to 30 c.m. diameter of stem. Leaves obovate-elliptical, tapering to both ends, sinuate or lobed, 10-15 c.m. long, 5-8 c.m. wide, ultimately glabrescent. Panicle terminal, often 30 c.m. or more across; heads 1.5-2 c.m. diameter, involucre bracts blunt, corolla white or tinged with purple; pappus grey or rusty brown. Frequent throughout the Province; or it may be that several species of Vernonia having the same general appearance are taken collectively under the common names given above.

PLATE LXXIII. A. 1, Part of panicle, in fruit; 2, Seed and Pappus,  $\times 2$ ; 3, Flower,  $\times 2$ ; 4, Hair of Pappus,  $\times 5$ .

164. **BRACHYLÆNA.** Dioëcious. Heads discoid, many-flowered, in axillary or terminal racemes or panicles. Involucre of many dry imbricating scales; receptacle naked; corolla tubular. Male flower—anthers exserted, tailed at the base; style simple, filiform; ovary abortive, hispid. Female flower—anthers abortive, separate; pistil exserted, bifid; achenes glandular-pubescent, with 2 rows of bristles as pappus. Leaves alternate, entire or toothed or 3-lobed, coriaceous, glabrous on the upper surface, glabrous or tomentose below. A small genus of resinous shrubs, endemic to extra-tropical South Africa.

**B. discolor**, De Cand. *Vern. names*—4, 15, Pahla, Impahla, or Intsombelo; 5, Bacha (Mugude); 6, Tsumbi; 13, i-pahla. A small grey tree 7-10 metres high, 30-45 c.m. stem diameter; leaves oval-obovate, obtuse, cuneate at the base, glabrous above, white tomentose beneath, 7-10 c.m. long, 3-4 c.m. wide; panicles mostly terminal, shortly conical, up to 30 c.m. long, those of the male trees looser and fewer-flowered than the female. Flowers very variable in size; involucre scales woolly at the edges. Abundant around Lourenço Marques and along the coast; present but less common inland, and not observed north of Inhambane; occurs also in Cape Colony and Natal.

PLATE LXXIII. B. 1, Panicle; 2, Flower-head,  $\times 7$ ; 3, Flower,  $\times 4$ ; 4, Empty receptacles, after seed has fallen; 5, Seed and pappus, side view; 6, Same, top view, showing single circle of long hairs.

165. **TARCHONANTHUS.** Dioëcious. Florets all regular; heads few-flowered, arranged in lax terminal and axillary panicles. Involucre erect, close; receptacle hairy, corolla tubular with short 5-fid spreading limb. Male flower—stamens exserted, ovary abortive with slender single style and large nectary. Female flower—stamens abortive; nectary absent; style exserted, bifid; achenes very woolly, but without pappus. An African genus, of 2 species.

**T. camphoratus**, Linn. *Vern. names*—2, Arvore de Camphora; 14, Camphor hout. Shrub or small tree, usually much-branched from the base and producing upright virgate branches, but sometimes forming a clean stem 20-25 c.m. diameter and growing into a tree 5-7 metres high. Leaves lanceolate or obovate, bluntly pointed, shortly petioled, 7-15 c.m. long, 1.5-4 c.m. wide, entire, coriaceous, reticulated, white-tomentose beneath, at first grey-tomentose above, afterwards glabrous. Leaves on coppice shoots wider, more oval, and often distinctly toothed. Panicles 15-20 c.m. long and wide, lax, but many-headed. Female flower-heads 3-5 flowered; involucre scales ovate; achenes very woolly. A hoary shrub, highly scented. Present on the sea-dunes near Lourenço Marques, also occasionally, but rarely, in the forests throughout the Province. For illustration see "Forest Flora of Cape Colony," p. 245, Plate XCI.



## COROLLIFLORÆ. GROUP II. Ovary superior.

## COROLLIFLORÆ. GROUP II. SECTION 1. Corolla regular.

## FAMILY XL.—ERICACEÆ.

Shrubs or shrublets having small linear whorled leaves, regular hermaphrodite flowers and often paniculate inflorescence. As represented here the characters are:— Calyx 4-5 fid or parted. Corolla hypogynous, gamopetalous, usually tubular, 4-lobed. Stamens 4-8, opposite the corolla lobes when of the same number. Anthers usually opening by pores. Ovary superior, in the larger kinds usually 4-celled. Fruit dry, capsular, dehiscent.

166. **ERICA.** Calyx equally 4-parted or 4-fid; corolla usually longer than the calyx, often viscid. Stamens 8, on a hypogynous disc; anthers opening by pores; ovary superior, 4-celled; cells usually many-ovuled. Capsule 4-celled, loculicidal; seeds minute, numerous. Leaves linear, usually whorled and less than 1.5 c.m. long, often ciliate. A large genus, mostly South African, represented here by a single species, probably *E. arborea*, which occurs on the poor wet sandy soil of the pans at Manjacaze (Gaza) and near Mutamba (Inhambane) and also in similar situations in Magenja da Costa, where it forms dense pure thickets 1-3 metres high, with stems up to 10 c.m. diameter. *Vern. name*—10, Muzabo.

## FAMILY XLI.—MYRSINÆ.

Trees or shrubs usually glabrous, with alternate, exstipulate, simple leaves, and flowers in axillary fascicles or panicles. Flowers regular, hermaphrodite or polygamodiceous, 5-merous; the calyx minute, 5-toothed; the corolla monopetalous; the stamens opposite the corolla-segments and inserted at their base; ovary usually superior, 1-celled, with a free central placenta, and 1 or many ovules. Fruit 1 or many-seeded, small, globose. A large Family, mostly tropical, represented here very sparingly by 1 genus.

167. **MYRSINE.** Polygamous or diœcious evergreen trees or shrubs, having alternate, exstipulate simple leaves, and flowers in axillary fascicles or raised in clusters on axillary warts. Calyx very small, 5 (or sometimes 4) toothed; corolla with a short tube and a rotate or erect 5 (or 4) fid limb, each segment bearing a sessile anther on its face; ovary globose with a short style, capitate stigma, and few ovules bedded in a peltate central placenta; fruit globose, 1-seeded. Seed albuminous. A mostly tropical genus, poorly represented here.

**M. melanophleos**, R. Br. *Vern. name*—13, Isiquane-we-hlati. An evergreen timber tree 7-20 metres high, which enjoys exposure to sunshine. Leaves alternate, but rather crowded to the point of the young twigs, and often absent from older wood, 7-15 c.m. long, 2.5-5 c.m. wide, entire, thick, coriaceous, glabrous, oblong or widely lanceolate, deep green and shining above, opaque green below, and with a stout petiole 10-12 m.m. long. Flowers shortly stalked, crowded in axillary clusters or on axillary warts, usually on the old wood, greenish, inconspicuous, 5-merous. Flowers diœcious, though apparently not so, and flowers sexually dimorphic on different trees. Petals ciliate and minutely downy along the margin on the inner surface, especially those of the male flower. Female trees seed abundantly; male trees bear no berries. Corolla gamopetalous, 5-lobed, each segment bearing a sessile stamen on its face. Ovules about 4, hedged in a globose central placenta. Fruit 1 c.m. diameter, globose, glabrous, 1-seeded, the seed hard and horny. For illustration see "Forest Flora of Cape Colony," Plate XCIII.

Concerning the Abyssinian *M. simensis*, Hochst, Baker remarks, "differs from *M. melanophleos* mainly by its longer pedicels and more numerous flowers in a cluster," while his descriptions of *M. querimbensis*, Klotzsch, and *M. melanophleos* only indicate the sexual differences of the latter already referred to.

## FAMILY XLII.—SAPOTACEÆ.

Trees and shrubs, often with a milky juice in the bark. Leaves petioled, alternate, simple, entire, coriaceous, exstipulate, often rusty on the under surface. Flowers hermaphrodite, axillary or terminal, clustered or single, pedunculate or sessile, the pedicel and calyx often rusty-pubescent. Calyx-segments either 5 or 6-8; in the latter case they are in 2 rows, the outer long, the inner shorter and less firm. Corolla gamopetalous, deciduous, with as many or 2-3 times as many segments as the calyx, in 1, 2 or 3 rows. Fertile stamens the same number as the calyx-segments, with or without intermediate staminodia. Ovary 5-8 celled, with axile placentation, and 1 ovule in each cell. Fruit pulpy, 1 or several-seeded, in some cases edible. A tropical and widely distributed Family, poorly represented here.

168. **CHRYSOPHYLLUM**. Trees with exstipulate entire leaves, and clustered small flowers in the axils or on older wood. Calyx campanulate, 5-fid, the segments imbricating irregularly; corolla tubular, 5-fid; stamens 5, sessile, 1 on the face of each corolla-segment. Staminodes none. Ovary 5-celled with a short style; 1 ovule in each cell. Berry fleshy, usually 1-seeded. Seed albuminous. A large genus of tropical trees.

**C. natalense**, Sond. *Vern. names*—4-8, Mnwebe; 10, 11, Mnewe; 13, Tungwane. A large and valuable evergreen timber tree, 10-20 metres high, and with stem up to 45 c.m. diameter, usually growing in the open or gregariously, and with much-branched bushy crown. Leaves 7-15 c.m. long, 2-4 c.m. wide, coriaceous, obovate or widely lanceolate, rounded or bluntly pointed, entire, shortly petiolate, at first rusty-pubescent or tomentose, afterwards glabrous and shining above, silvery on the under surface. Flowers numerous, almost sessile, in axillary clusters on old wood. Calyx 5 (-6) fid more than half-way, the segments erect, imbricate, ovate, pubescent. Corolla tubular, constricted about the middle, rather longer than the calyx, glabrous, limb of 5 sub-erect segments which are often irregularly 3-5 toothed at the apex. Ovary 5 (-6) celled, hairy, style short. Fruit 1-2 c.m. long, oblong, minutely pubescent, almost sessile, red or white, edible, usually 1-seeded. Abundant throughout the Province and extends to Natal and Pondoland. See "Forest Flora of Cape Colony," p. 252, Plate XCIV.; "Natal Plants," Plate 378.

PLATE LXXIV. A. 1, Flowering branch; 2, Flower,  $\times 3$ ; 3, Flower, petals removed,  $\times 5$ ; 4, Corolla opened,  $\times 5$ ; 5, Ovary and pistil,  $\times 5$ ; 6, Tree, general habit.

**C. magalismontanum**, Sond. *Vern. names*—4, M-bovan-hlati; 10, Mpudo. A large forest tree, very similar in general aspect to *C. natalense*, but with rather larger, more distinctly obovate leaves, rounded or apiculate at the apex, not silvery underneath when mature. Flowers crowded, almost sessile, small, hard, pubescent. Fruit edible. Frequent from Quelimane northward, and occasionally south to Maputa.

Other 2 species occur in Lourenzo Marques and Maputa which are almost certainly *Chrysophyllum*, but of which neither flowers nor fruit were seen. One of these (4, Ngwamba, Sim 6280) is a small spreading tree on the flats below the Maputa Lebombo's, much branched with short rigid twigs of 10 c.m. length, leafy at the point only. Leaves obovate, 2-4 c.m. long, emarginate, nearly sessile, finely veined, glabrous, not silvery, and often crowded on abortive warty branches.

The other (4, Ntana, Sim 5112), a small glabrous tree found at Matolla, has obovate petiolate leaves 4 c.m. long, rounded at the apex, not silvery, and confined to the upper part of the young branches.

169. **SIDEROXYLON**. Glabrous evergreen trees with simple entire exstipulate leaves and clustered axillary inflorescence. Calyx saucer-shaped, 5-partite, the segments irregularly imbricate. Corolla with a very short tube and funnel-shaped or rotate 5-partite limb. Fertile stamens 5, inserted in the throat of the tube, 1 opposite to each corolla-segment, filament slender, anther ovoid, extrorse; staminodia 5, without anthers, alternate with the stamens, and inserted lower in the corolla-tube. Ovary superior, globose, 5-celled, with a short linear style. Berry fleshy, by abortion 1-seeded; seed albuminous. A tropical and sub-tropical genus, poorly represented here.

**S. inerme**, Linn. *Vern. names*—1, White Milkwood; 4, Mabope; 13, Umqwashu; 14, Witte Melkhout; 15, Impusha. An evergreen tree, sometimes erect, spreading and umbrageous, but more frequently branched and bushy from near the base. Leaves alternate, exstipulate, coriaceous, glabrous, glossy above, paler below, entire, elliptical, oblong or obovate, obtuse, shortly petiolate, 7-10 c.m. long, 3-5 c.m. wide, regularly distributed along the branches. Flowers disagreeably scented, axillary, in clusters of 1-10, often raised on short warts; pedicels 6-12 m.m. long; flowers 6 m.m. across. Calyx finely pubescent and ciliate; corolla with a very short tube and rotate limb; stamens longer than the corolla-segments; anthers dorsifixed, extrorse; staminodia lanceolate, petaloid, as long as the filaments. Ovary hairy, 5 or occasionally 4-3 celled, style short, obtuse. Fruit 1-1.5 c.m. diameter, globose, black, shining, and with white viscid juice; seed somewhat 5-lobed. A first-rate timber where large enough. Abundant along the Swaziland railway below the Lebombo's, and in the Lebombo kloofs, usually as a spreading bush. Occurs also sparingly north to Inhambane. For illustration see "Forest Flora of Cape Colony," p. 252, Plate XCV.

170. **MIMUSOPS**. Trees or shrubs, with milky latex in the bark, which from some species may be collected or expressed for caoutchouc. Leaves simple, evergreen, exstipulate, alternate, entire, coriaceous, shortly petioled, often absent or scarce on the lower part of the branch; flowers axillary, on 1-flowered peduncles or in small umbels. Calyx-segments 6 or 8 in 2 rows, the outer the larger and firmer; corolla cut nearly to the base into linear white segments, 2-3 times as many as the calyx-segments, and in 2-3 rows; at first forming an erect cone, afterwards twisting singly. Stamens much shorter than the corolla, 6-8 stamens perfect with short slender filaments and cordate pointed anthers, alternating in 1 row with an equal number of wider subulate staminodes without anthers; ovary superior, globose or subulate, hairy, 6-8 celled, with a simple style. Berry globose, oblong or ovate, pointed by the style, more or less edible, usually 1-seeded. Seeds albuminous, horny, flattened, with an obliquely basal hilum, usually only 1 or 2 in a berry, sometimes more.

**M. Henriquesiana.** *Vern. names*—5, Menjela ; 6, Banjela and Rungulo. A large or very large tree, sometimes 20 metres high, 1 metre stem diameter, with spreading branches and abundant heavy foliage. Leaves crowded upward, variable in form from widely lanceolate, elliptical or obovate to nearly round, usually bluntly pointed, tapering to the 2-3 c.m. petiole, 5-7 veined on each side, glabrous and green. Flowers axillary, several together, the peduncles 2 c.m. long and like the brown calyx shortly pubescent. Floral parts 6-merous (seen in bud only); fruit oblong, 2 c.m. long, edible. Young growth set with scattered loose white hairs. A noble tree, with a thick rough bark containing a large quantity of Caoutchouc. Dr. Feriera on whose farm near Manjacaze, Lower Gaza, a large quantity of it grows, has had this latex expressed and sent to Europe, where it was considered suitable for many purposes and valued at 2/6 per lb. As the latex does not flow with sufficient force to allow of its being collected from the surface, expression is the only means of obtaining it, and I doubt whether under present conditions and for the value stated, this can be done with profit. The latex is there as it is in the other species of *Mimusops*, but till cheaper extraction can be devised or higher value obtained I fear it must remain there. The tree is frequent in Gaza, M'Chopes and Inhambane, and what appeared to be the same species was also seen in Magenja da Costa.

PLATE LXXVII. A. 1, Flowering branch ; 2, Fruit.

**M. Mochisia**, Baker. Unknown to me; described as "a bush or low tree with the habit of *Prunus spinosa*, with the leaves with the umbels in their axils mostly in dense lateral or terminal fascicles. Branchlets not at all tomentose." Leaf oblanceolate-oblong 2.5-5 c.m. long, 15-18 m.m. wide, obtuse, cuneate at the base; flowers 6-merous, on slender glabrous pedicels 6-12 m.m. long. "Fruit yellow, glabrous, the size of a bullace. Seeds 3-4 maturing." Zambesi-land at Senna and Tete. Sir John Kirk.

**M. Kirkii**, Baker. *Vern. name*—10, Gamanewe. A large tree, producing abundant latex, and not uncommon in the forests of Magenja da Costa and Nhamacurra, and recorded from the junction of the Shire and Zambesi, and from the Rovuma. Leaves roundly obovate-oblong, rounded and shortly apiculate at the apex, 4-5 c.m. long 2-4 c.m. wide, glabrous, tapering shortly at the base, with fine veination, and with slender petiole 2-3 c.m. long. Flowers 8-merous, outer 4 sepals tomentose. Fruit globose, 2 c.m. long, suddenly pointed by the style, yellow, edible.

**M. obovata**, Sond. *Vern. names*—1, Red Milkwood; 4-6, Nolle or Tole; 13, Umtunzi or Amasitole; 14, Roode Melkhout; 15, in-tembe. A deep-green upright evergreen timber tree, up to 15 metres height and 60 c.m. stem diameter. Leaves fairly evenly distributed along the branches, but occasionally branches or twigs are leafless below. Leaves narrowly obovate, rounded or bluntly pointed at the apex, tapering below to the 6-12 m.m. petiole, soon glabrous, pale below, 3-7 c.m. long, 12-25 m.m. wide. Flowers solitary or few in an axil, on brown-pubescent peduncles 12-18 m.m. long, 8-merous, 2 c.m. across; fruits 2-3 c.m. long, 1.5 c.m. diameter, ovate or ovate-acuminate, usually tapering to the style. Occurs sparingly from Maputa to M'Chopes; for illustration see "Forest Flora of Cape Colony," Plate XCVI.

**M. caffra**, E. Mey. *Vern. names*—1, Red Milkwood; 4, 5, 6, Tole or Chole; 13, Um-Nweba and Um-tunzi. A somewhat hoary or glaucous evergreen tree or shrub forming a large proportion of the sea-dune vegetation, but also extending inland on sandy soils. On the dunes it grows down to the watermark, fully exposed to sea-winds, and is consequently usually dwarfed in stature and heavily branched from the base where these winds prevail. In shelter it gets up to about 10 metres and 30-45 c.m. diameter, but even there it is heavily branched and very gnarled and crooked and consequently yields first-rate knees, &c., for boat-building. Branches, leaves and inflorescence abundantly rusty-pubescent when young, and retaining the pubescence or silkiness, at least on the under surface of the leaves and on the pedicels and calyces. Leaves 3-5 c.m. long, 2.5 c.m. wide, firmly coriaceous, widely obovate, often rounded or emarginate at the apex, tapering to the short petiole, and often with the margin reflexed. Flowers usually in clusters of 2-4 in the axils along the branch; peduncles 2-3 c.m. long. Flowers 8-merous, corolla usually in 2 rows, staminodia ovate, acute, hairy. Ovary 6-8 celled, hairy. Fruit 2 c.m. long, 1.5 c.m. wide, tapering to the point, red, edible by children, 1-seeded, the seed shining brown. Abundant along the coast and through M'Chopes; as also in Cape Colony and Natal.

PLATE LXXV. A. 1, Branch; 2, Sepals; 3, Pistil,  $\times 2$ ; 4, Petals and stamens,  $\times 2$ ; 5, Fruit; 6, Seed.

**M. marginata**, N. E. Brown. *Vern. name*—10, Mooijanago. A large evergreen tree 6-20 metres high, with dense heavy foliage. Leaves crowded at the end of the twigs and the flowers occur about 2 in the axil of each of the inner leaves, and in the axils of scales inside them, forming together a cluster of 12-20 flowers terminating the leafy twig, the bud from which growth is continued arising below the flowers. Leaves obovate or elliptic-obovate, acuminate, rounded at the base, glabrous, shining 10-20 c.m. long, 3-6 c.m. wide, with petioles 1-3 c.m. long. Pedicels 2-5 c.m. long, dense but minutely rusty-pubescent, as also are the scales, calyces and young fruits. Flowers 8-merous. Petals 24, often fimbriated at the apex; filaments villous; staminodes hairy. Fruit elliptical 3-4 c.m. long, 2.5 c.m. diameter,



glabrous, purplish-red, edible. Expanded flower 4 c.m. across, dull white. Along streams in Magenja da Costa (tropical), also occasionally through the Province and in Natal and Cape Colony. A fine tree, with a good fruit. For illustration see "Forest Flora of Cape Colony," p. 254, Plate XCVII. fig. 1.

## FAMILY XLIII.—EBENACEÆ.

Flowers dicecious or rarely hermaphrodite, regular. Calyx gamosepalous, 3-6 lobed, often accrescent in fruit. Corolla gamopetalous, 3-6 lobed, lobes contorted in bud. Stamens almost sessile, usually several times as many as the corolla-lobes, in one or more rows; in female flowers abortive, few or absent. Anthers introrse, lanceolate. Ovary superior, several-celled, in male flowers rudimentary; ovules pendulous, anatropous, solitary or in pairs, usually twice as many as the styles. Fruit coriaceous or more or less fleshy, sometimes edible; seeds albuminous, horny. Hard-wooded unarmed trees, shrubs or shrublets, with exstipulate, alternate, opposite, sub-opposite or ternate, simple entire leaves, and axillary simple, racemose or paniculate inflorescence, and without milky juice. A tropical and sub tropical group of little forestal value.

171. **ROYENA.** Flowers apparently hermaphrodite, often actually unisexual, or one sex weak. Calyx 5-fid or 5-partite, pubescent, sometimes enlarging after flowering. Corolla with an urceolate tube, and spreading 5-fid limb which is twisted in aestivation. Stamens 10, in 1 row, inserted on the base of the calyx-tube; filaments very short, anthers oblong or lanceolate, hairy. Ovary pubescent; style branches 2-4; cells twice as many. Fruit globose or ovoid, pointed by the style, coriaceous or fleshy, indehiscent or splitting. An African genus of shrubs or small trees, well represented in South Africa, of which several species extend along the Lebombo and through the M'Chopes, and one, *R. pallens*, Thun., is frequent in the inland parts of Magenja da Costa and Nhamacurra. None of these are tree or of timber size; several share with *Euclea* the *Vern. name*, 4, 15, Magitamus or Ketums, and one species is called, 4, Inthababane. Concerning several *Royena*-like trees, see under *Diospyros*. For illustrations of the species see "Forest Flora of Cape Colony," p. 256, Plates XCVIII., XCIX., and CIII.

172. **EUCLEA.** Dicecious. Calyx 4-5 lobed, not accrescent. Corolla bell-shaped, 4-5 fid or lobed, twisted in bud. Male flower with 10-32 stamens inserted on the base of the corolla-tube, and having a rudimentary ovary; female flower with no stamens, but a 4-celled, 4-ovuled, usually pubescent ovary, and 2-lobed styles. Fruit globose, indehiscent, 1-seeded. Evergreen trees or shrubs with alternate, sub-opposite, opposite or ternate, simple exstipulate leaves, and axillary racemes or panicles of small yellowish flowers. An African genus of shrubs or small trees, usually hard-wooded, and with very undecided characters. In Cape Colony there are at least 15 species (see "Forest Flora of Cape Colony," page 260, Plates CI., CII., CIII., CIV.); several of these extend along the Lebombo range, and also along the sea dunes and through M'Chopes, and several similar if not identical species are present in Magenja da Costa and Nhamacurra. They are of no forestal importance or value; and the *Vern. names* overlap the species. Among these are, 4, Hlangula and Quetamunzi; 10, Mlala or Mulalo; 4, 15, Magitamus or Ketums. Among species belonging to this Province not included in the "Forest Flora of Cape Colony" are the 2 following, transcribed from the "Flora of Tropical Africa," viz.:—

"**E. divinorum**, Hiern, Monogr. Eben. p. 99. A shrub, nearly glabrous and somewhat glaucous; branches terete. Leaves opposite or sub-opposite, elliptical, narrowed more or less from the middle towards each end, especially towards the base, obtuse, coriaceous, glaucescent above, reddish and somewhat farinaceous beneath,  $1\frac{1}{2}$ - $2\frac{1}{4}$  by  $\frac{1}{2}$ - $\frac{3}{4}$  in.; veins inconspicuous; margins undulated; petiole about  $\frac{1}{2}$  inch long. Male flowers in crowded racemes or panicles, 10 or more together, 4-5 merous, hemispherical; cymes not more than  $\frac{3}{4}$  by  $\frac{1}{2}$  in., usually erect; pedicels  $\frac{1}{10}$  in. long, spreading, longer than the small caducous bracts. Calyx  $\frac{1}{20}$  in. long; lobes short. Corolla deeply lobed; lobes rounded. Stamens 16; anthers oblong, hairy, longer than the glabrous filaments. Ovary rudimentary, represented by a bunch of hairs. Female plant unknown. Victoria Falls, *Kirk!* Occurs also at Delagoa Bay, south of the Tropic and in Basuto-land.

"**E. fruticosa**, Hiern, Monogr. Eben. p. 101. A small or arborescent shrub, with softly pubescent tawny terete branches. Leaves alternate or sub-opposite, obovate-oblong, wedge-shaped at the base, coriaceous, quickly glabrescent or nitescent,  $1\frac{1}{2}$ - $4\frac{1}{2}$  by  $\frac{3}{4}$ - $1\frac{1}{2}$  in. delicately reticulated; margins reflexed; petiole  $\frac{3}{10}$ - $\frac{2}{3}$  in. long, pubescent. Male plant unknown. Fruiting racemes or panicles ranging up to 1-in. long, with about 20 fruits, pubescent; pedicels short, thickened upward to the articulation with the calyx. Calyx 5-lobed; lobes deltoid, acute, small; tube consolidated in fruit. Corolla sometimes marcescent, apparently 4-5 cleft; lobes ovate. Fruits tawny-pubescent,  $\frac{1}{4}$ -in. diam. 1-celled. Seed solitary; albumen uniform. Between Tete and the sea coast, *Kirk!* Luame, mouth of the Zambesi, *Kirk!* Dar Salam, *Kirk!*"

173. **MABA.** Dicecious. Calyx cup-shaped, increasing in size as the fruit advances, which at maturity resembles a small acorn set in its cup. Corolla short, 3-lobed; lobes twisted to the left. Stamens in male flower 3-9, glabrous, hypogynous, separate; in the female flower abortive. Ovary in the male flower rudimentary, in the female flower 3-celled, cells 2-ovuled. Style 3-toothed. Fruit a dry or fleshy berry. Seeds albuminous. Hard-wooded trees with small alternate leaves and axillary

flowers, represented by about 60 species, 6 of which are described in "Flora of Tropical Africa" from further north, while only 1 species, a Natal tree, is known to extend into the Province.

**M. natalensis**, Harv. *Vern. names*—4, Tchintomane, Chintomane, or Mantomane; 10, Mgunaritch; 13, Tchicwane; 14, Smalblad; 15, Velenda. A tree 7-15 metres high, with very horizontal densely foliated branches. Twigs numerous, slender, pubescent when young. Leaves alternate, often distichous, oval,  $\frac{1}{2}$ - $\frac{3}{4}$  inch long, coriaceous, glabrous above, paler below, shortly petioled, and when quite young pubescent on the petiole, midrib and leaf-margins, but soon glabrous. Growth-buds enclosed in hard brown ciliate scales. Flowers axillary, solitary or 2-3 together, almost sessile, inconspicuous. Calyx cup-shaped, without lobes, glabrous. Corolla small, externally hispid, 3-lobed. Staminodia in fertile flower 6-9, separate, glabrous. Ovary glabrous, 3-celled; cells 2-ovuled. Fruit 1.5 c.m. long, acorn-shaped in the green calyx-cup, yellow when ripe, rather succulent though hardly edible. Frequent in the Maputa Lebombos, usually as a shrub; occurs also in M'Chopes (extra-tropical) and Magenja da Costa (tropical). In Cape Colony and Natal it is confined to the coast-belt, but in this Province it extends at least 50 miles inland. For illustration see "Forest Flora of Cape Colony," p. 259, Plate C.

174. **DIOSPYROS**. "Trees or shrubs, with alternate shortly petiolate leaves, and usually small axillary solitary or shortly cymose flowers. Calyx usually campanulate and 4-5 lobed, rarely 3 or 6-lobed, often accrescent in fruit. Corolla tubular or campanulate or rotate, usually 4-5 lobed; lobes usually spreading or recurved. Stamens 6-many, usually about 16 and more or less united by their base in pairs or otherwise, inserted at the base of the corolla or hypogynous, in female flowers absent or usually fewer than in the male and abortive; anthers linear or lanceolate; filaments usually shorter or almost obsolete. Ovary globose, ovoid or conical, 4 or 8-celled, glabrous or hairy, in male flowers rudimentary; styles or style branches 2-4, stigmas usually emarginate; ovules solitary. Fruit globose, oblong or conical, coriaceous or thin skinned, often pulpy inside and edible. Seeds 1-8, oblong or hemispherical or globose; albumen uniform or ruminated." I was singularly unfortunate in regard to this genus, for while it is believed to be fairly well represented in the Province, not one flower was found, and consequently the leaves, if found, must remain among my incognitæ. The fruit alone is insufficient for identification, but 2 species collected by me appear from the fruits to be *Diospyros*, viz. :—

**D. sp.** (Sim 6251.) *Vern. names*—4, Toma or Um-toma; 3, Jakals-besje. A large tree, found mostly quite leafless, but with nearly globose, several-seeded, sessile fruits 2 c.m. diameter still present, with 5-lobed pubescent calyx 12 m.m. across, having recurved undulate margins. Leaves in the first stage of development scabrid-pubescent, afterwards pubescent or glabrescent, widely lanceolate, elliptical or obovate, 10 c.m. long, 1-3 c.m. wide. Soft white sapwood; timber said to make good felloes. May be *D. mespiliformis*, but I think not. Umbelusi and toward the Lebombos (*extra-tropical*).

**D. sp.** (Sim 6397.) A littoral much-branched shrub or small tree forming half of the dense bush vegetation at Bartholemew Dias (tropical). Bark white, younger growth finely pubescent. Leaves 2-3 c.m. long, 1.5-2 c.m. wide, oval or somewhat obovate, rounded at the apex and base, shortly petioled, glabrous, green above, pale below. Fruits almost sessile, depressed-globose, 2 c.m. diameter, 1.5 c.m. deep, purplish, 1-several seeded; calyx 2 c.m. across in fruit, apparently somewhat accrescent, spreading, with 5 cordate or reniform puberulous segments and a disc 1 c.m. across. Seldom of timber size.

The following specific descriptions are mostly condensed from the "Flora of Tropical Africa":—

**D. mespiliformis**, Hochst. A shrub or tree 6-60 feet high or more; wood compact, often black in the middle. Young shoots and inflorescence ferruginous-tomentose, leaves oblong or elliptical 2-6 inches long,  $\frac{2}{3}$ -2 $\frac{1}{2}$  inches wide, at first pubescent. Flowers white, dioecious; inflorescence axillary, short. Male flowers few or many together 5 (or 4) merous; calyx hairy on both sides, lobes ovate or lanceolate; corolla urceolate-oblong; stamens 10-16, often in pairs; ovary rudimentary, hairy or wanting. Female flowers solitary or 3-1 together 5 (or 4-3) merous; staminodes 6-8 in 1 row, ovary ovoid or conical, silky, terminated by 2 short hirsute bilobed styles, 4 or 8-celled and ovuled. Fruit sub-globose  $\frac{3}{4}$ -1 inch diameter, 4-5 seeded, edible. Albumen somewhat ruminated. Tete, Senna, Laputa, and other parts of Tropical Africa. Moraes (Manual Practico de Agricultura), who describes it as a small tree with excellent timber, gives its names in Angola as, 2, Silvera or Musolviera; 17, Mulende, and in Zambesia, 16, Hourabassa.

Mr. Burt Davy (Kew Bulletin No. 4, 1908) gives several Transvaal localities, as also "Mathibis Kom inter Lourenco Marques et Komati River Drift, Aug., 1886, arbor 40-50 pedalis, *Bolus*, 7847," and states "Common in the Eastern middle veld of the Zoutpansberg; between 2000-2500 ft. alt. a conspicuously large tree with dark foliage, usually occurring on ant heaps in grey soil. Fruit eaten by Kaffirs." This probably yields part of the black-hearted timber produced in most parts of the Province and known as *Ebony*, which should have an export value.

- D. verrucosa**, Hiern. A shrub; young parts densely pubescent. Leaves ovate-oblong, nearly glabrous above, paler and pubescent below, and rufous pubescent on the veins on the under surface. Female flowers solitary, fruiting peduncles stout, 1 c.m. long; fruiting calyx spreading, 4-fid, 1 c.m. diameter. Fruit oblong or globose, roundly 4-sided, verrucose 2·5-3 c.m. long, 2·2·5 c.m. diameter, 4-celled, cells 1-seeded. Albumen ruminated. The pulp of the fruit is eaten. Zambesia, Rovuma River 20 miles up.
- D. senensis**, Klotzsch. Shrub or tree; young shoots pubescent. Leaves obovate-oblong, suddenly narrowed or acuminate or occasionally rounded at the apex, membranous, deep green above, yellowish-pubescent beneath, 5·18 long by 2·5-9 c.m. wide; petiole hairy, up to 1 c.m. long. Inflorescence axillary in short 1-5 flowered yellowish-pubescent cymes; flowers mostly diœcious, yellowish-green, fragrant, 4-merous; calyx shortly lobed, stamens 16, in pairs; absent from the female flowers. Fruit 2·5 x 2 c.m. Albumen uniform. Senna, Zambesi and Shire.
- D. squarrosa**, Klotzsch. *Vern. name*—16, Mutshenje tuna tuna. Tree or shrub; young parts hispid; leaves elliptical or somewhat obovate, rounded at both ends, with scattered pubescence above, and with more dense and brown pubescence below, 3-9 c.m. long, by 2·5 c.m. wide. Female flowers solitary, drooping, 4-merous. Calyx deeply 4-lobed. Staminalodes none. Ovary 8-celled, 8-ovuled. Fruit glabrous, somewhat 4-sidedly globular, 1 c.m. diameter; fruiting calyx with pendent lobes, not accrescent. Senna, Tete, &c., in Zambesia.
- D. Loureiriana**, G. Don. *Vern. name*—16, Nhamodema (*Peters*). Shrub or tree; young parts pubescent. Leaves oblong or obovate-oblong, more or less acuminate at the apex, obtuse, rounded or sub-cordate at the base, sub-membranous 2-10 c.m. long, 1-6 c.m. wide; petiole 5-20 m.m. Flowers hermaphrodite or polygamous, drooping, cymes 3-many flowered; calyx deeply 4-lobed, more or less accrescent. Stamens 8, in 1 row; abortive (as staminodes) in female flowers. Ovary globose or ovoid-conical. Fruit globose, 2·5 c.m. diameter, 4-celled, 4-seeded. Albumen uniform. Senna; Rovuma; between Laputa and Tete, Quiloa, &c.
- D. Kirkii**, Hiern. A tree; young shoots ferruginous, tomentose-puberulous. Leaves oval or oval-oblong, rounded at both ends, coriaceous, velvety-pubescent on the under surface 4-10 c.m. long, 2-6 c.m. wide. Flowers diœcious, axillary; the female flowers solitary, the male in very short several-flowered cymes. Flowers 4 (or 5) merous; corolla inflated-tubular; stamens 9-10, unequal; in the female flower staminodes 8, glabrous. "Zambesia, above Tete; fruit good when made into a cake, common. *Kirk*."

Another small tree in the forests of Magenja da Costa has 5 accrescent oblanceolate calyx-lobes 3 c.m. long, pubescent, superior, globose fruit 2 c.m. diameter, elliptical-petiolate glabrescent leaves canescent below, and about 9 side veins on each side of the midrib, appears at first sight to belong to Ebenaceæ, but it has stipules and the fruit is 1-celled with 1 round seed about 5 m.m. diameter. So far as I find it is undescribed, but in the absence of flowers there is nothing to show whether it be to Thalamifloræ, Calycifloræ or Corollæfloræ that it belongs. Sim 6109.

The name, 10, Nadente, belongs to a large tree in the forests of Magenja da Costa apparently belonging to Ebenaceæ, with dehiscent fruits and flat valves arranged in a star. Sim 5834.

#### FAMILY XLIV.—OLEACEÆ.

Trees, shrubs or climbers, with opposite simple or pinnate leaves, hermaphrodite flowers and terminal or axillary panicle inflorescence. Calyx and corolla hypogynous, 4-cleft or parted; stamens 2, inserted in the corolla-tube. Ovary superior, 2-celled. Fruit a drupe, a berry, or a capsule. A small Family, in which is included Jasminaceæ. Several members have medicinal properties, the Olive is cultivated for its oil, the Ash is a well-known and valuable European timber, Black Ironwood is a Cape timber, and among garden-flowering shrubs are the Lilac (*Syringa*), Privet (*Ligustrum*), Jasmine (*Jasminum*), &c.

175. **OLEA**. Trees or shrubs having opposite, exstipulate, simple, entire coriaceous leaves, panicle axillary or terminal inflorescence, and regular hermaphrodite flowers. Calyx 4-lobed; corolla with a very short tube and 4-parted limb, the segments valvate in aestivation; stamens 2, with short filaments, but slightly exserted. Ovary superior, 2-celled; ovules pendulous; style short; stigma capitate. Fruit a fleshy drupe, with a hard 1-seeded stone, and albuminous seed. A small genus belonging to the tropical and sub-tropical parts of Europe, Asia and Africa; better represented in South Africa than in this Province. The European Olive is the most widely-known species.

- O. verrucosa**, Link. *Vern. names*—1, Wild Olive; 4, 15, Nguma; 6, in-saca-saca; 13, Um-quma. A tree 7-10 metres high, 30-45 c.m. diameter of stem, branched a good deal and with little clean timber; sometimes much larger and more old and gnarled. Leaves lanceolate or linear-lanceolate, 5-10 c.m. long, 1-1·5 c.m. wide, tapering somewhat to both ends, acute, coriaceous, shortly petioled, the under surface clothed with small flat scarious yellowish scales so closely adpressed as to give



the appearance of a glabrous yellow surface, the upper surface and the twigs sometimes similarly clad at first and afterwards glabrous, in other cases almost glabrous from the first. Panicles axillary, trichotomous, not much branched, rather shorter than the leaves. Bracts deciduous. Fruit an oblong dry drupe about 6 m.m. long, shortly pointed. I cannot by the description in "Flora of Tropical Africa" distinguish *O. chrysophylla*, Lam., from *O. verrucosa*, except that the leaves of the former seem to be more regularly and densely coated with scales on the under surface, and to taper more toward each end. Frequent in some parts of the M'Chopes; also in the Maputa and Marracuene Lebombos, and in Natal and Cape Colony, where its durability ensures its use as a fencing pole.

It is probable that other Cape species of *Olea* occur in the southern districts but they did not come under my notice.

PLATE LXXVII. *C.*; and "Forest Flora of Cape Colony," PLATE CV.

176. **SCHREBERA.** Trees or shrubs, with simple or imparipinnate opposite leaves, paniculate inflorescence, and 2-celled, dehiscent, woody capsules with 1-winged pendulous seed in each cell. Calyx truncate or shortly toothed. Corolla rotate with a long tube; stamens 2, almost sessile.

*S. golungensis*, Welw. *Vern. names*—10, Nadora, Nyangweli and Imperiperi. A large or small tree, frequent in the forests of Magenja da Costa, Nhamacurra, and up the Zambesi. Leaves opposite, exstipulate, obovate, elliptical or oblong, tapering to both ends, shortly petiolate, sub-coriaceous, glabrous; panicle terminal, lax, flowers shortly pedicellate, 2-2.5 c.m. long. Calyx truncate; corolla-tube long, with short spreading limb. Capsule pear-shaped, 2-celled hard and woody, often spotted, 5 c.m. long, splitting loculicidally to the base into 2 valves, each cell containing 2 obliquely winged seeds and 1 unwinged (seed?). Seeds pendulous, straight on 1 side, shouldered and winged on the other, 3 c.m. long, 1 c.m. wide. Probably pubescent species also occur.

#### FAMILY XLV.—SALVADORACEÆ.

Shrubs or small trees, sometimes spinescent. Leaves opposite, coriaceous, entire. Flowers in panicles or axillary fascicles; regular hermaphrodite, or polygamo-dioecious. Calyx 3-5 lobed, corolla 4-5 lobed or with 4-5 free petals, imbricate. Stamens 4, hypogynous. Ovary 1-2 celled; ovules 1-2 in a cell, basal, anatropous. Berry fleshy, 1-seeded; seed exalbuminous.

177. **AZIMA.** Petals free; stamens free; branches spinose.

*A. tetracantha*, Lam. A spinescent dioecious shrub, 2-3 metres high, more or less drooping in habit with squarrose opposite simple leaves, and terminal and axillary spikes or tufts of inconspicuous greenish flowers. Calyx 4-cleft, valvate in aestivation, petals 4, free, hypogynous. Male flower—Stamens 4, hypogynous, ovary rudimentary. Female flower—Stamens small, sterile; ovary superior, 2-celled; ovules 2 in each cell, erect. Berry globose, white, pea-size, 1-seeded. Seeds exalbuminous. Leaves ovate or obovate, rounded at the base, mucronate, usually glabrous, coriaceous 3 c.m. long, 2 c.m. wide, shortly petioled; spines slender, sharp, 2-3 c.m. long, rising 1 or 2 from each axil, consequently often 4 in a whorl, rather longer than the leaves; often absent from flowering branches. Flowers numerous; axillary spikes 1.5-2.5 c.m. long, terminal spikes 10-15 c.m. long, with leaves and bracts in the lower portion. Frequent throughout the Province as also in Cape Colony and Natal. See "Forest Flora of Cape Colony," Plate CIII. fig 8.

178. **SALVADORA.** Unarmed shrubs or trees with opposite entire coriaceous leaves and very small unisexual panicked flowers. Flowers 4-merous, corolla tube short. Ovary ovoid, 1-celled, ovule solitary, erect. Drupe globose, seed globose.

*S. persica*, Garcin. A spreading small glabrous tree, with opposite oblong leaves 5-8 c.m. long. Panicles terminal and axillary, flowers minute; drupe globose 3-5 m.m. diameter. Zambesia and other parts of Tropical Africa; also "near Shepherd's, about 18 miles from Lourenço Marques. Bolus, 9701."

#### FAMILY XLVI.—APOCYNACEÆ.

Flowers hermaphrodite, regular. Calyx 5-parted, imbricate; corolla gamopetalous, hypogynous, regular, tubular with a spreading 5-lobed limb, the segments convolute in bud; stamens 5, inserted on the corolla-tube, and alternate to its lobes. Ovary superior, 1-2 celled, or the 2 carpels separate, the styles confluent above, and stigmatose below the summit. Fruit 2 follicles or a berry or drupe; seeds with or without wings or tails, exalbuminous. Inflorescence terminal or axillary, few or many-flowered. Leaves simple, often exstipulate, opposite or whorled, entire. Trees, shrubs, climbers or herbs, often yielding milky latex or bitter poisonous juice; *Landolphia*, *Clitandra*, *Kickxia* and others yield valuable rubber. A large and widely distributed tropical and sub-tropical Family.

179. **LANDOLPHIA.** Widely rambling shrubs, with opposite exstipulate simple entire leaves, terminal small corymbose or paniculate inflorescence, syncarpous 1-celled ovary, pear-shaped, many-seeded, 1-celled fruits, and tendrils which represent more or less modified inflorescence. Style short, not or hardly exerted from the calyx; calyx short, without glands inside. A considerable group, mostly belonging to Tropical Africa and its islands, and yielding much of the rubber exported from East and West Tropical Africa. In this Province *L. Kirkii* is the only *Landolphia* considered worth tapping under present conditions; other species occur but are not tapped. Concerning rubber see chapter V. *L. Kirkii* is well known and distinct; the other species, with the exception of *L. florida*, were not in condition for determination at the time of my visit.

**L. Kirkii**, Dyer. *Vern. names*—4, i-bungu; 6, Mungu; 10, Impela. The rubber is called *Dande*. A slender and comparatively small-leaved creeper, the old stems however sometimes 10-15 c.m. diameter; smaller, more wiry and more sub-erect on sandy coast-lands than further inland. Leaves lanceolate or oblong, 3-8 c.m. long, 1-2.5 c.m. wide, shining dark-green above, shortly petiolate. Side veins close, numerous. Inflorescence rather lax in terminal corymbs on side branches. Flowers small, corolla-tube 4-7 m.m. long; ovary glabrous. Fruit globose or somewhat pear-shaped, 5-6 c.m. diameter, with a hard rind, yellow when ripe, dotted red or brown. Seed any shape by compression, 1.5 c.m. diameter. Fruit sweetly acidulous, edible, but rather stringy. Abundant in every part of the Province north of the Limpopo, present but less plentiful south of the Limpopo extending to the Umhlatusi in Natal. Enjoys best light sandy soil and much exposure, but rubber collecting is mostly done in fairly dense forest where the *Landolphia* is hanging on large trees.

PLATE LXXIX. 1, Flowering branch; 2, Flower,  $\times 6$ ; 3, Fruit; 4, Section of same.

**L. florida**, Benth. *Vern. names*—4, Tamunga; 10, Mtyili or Moembe, when near water; Mogo, when on dry ground; or some of these names may refer to other species, not *L. Kirkii*. A strong climber, having the flowers in sessile dense clusters on thick branches of the terminal panicle; these branches are usually curved backward, and with the occasionally twining habit of the main panicle-rachis aid the plant in its scandent habit. Leaves 3-7 c.m. long, 1.5-4 c.m. wide, elliptical, on 1 c.m. petioles. Flowers white, scented, beautiful, resembling some *Jasminum*. Calyx 4 m.m. long, corolla-tube 2.5 c.m. long, 2 m.m. wide, swollen just above the calyx; the lobes 2.5 c.m. long, acute, lanceolate, twisted, 6-7 m.m. wide. Fruit pear-shaped, 5-7 c.m. diameter, yellow, with a thick rind and many seeds. Frequent at Rueben Point, Polani, and round Lourenzo Marques. Present also, though less plentiful, throughout the Province.

PLATE LXXXVIII. A. 1, Flowering branch; 2, Fruit (much reduced).

**L. Buchananii**, Stapf. This, or a variety of it or allied species, is the Kew identification of specimens sent from Manica and Sofala by Mr. W. H. Johnston, Director of Agriculture to the Mozambique Company, and the species is also recorded from Nyasa-land and Shire Highlands. It is described as a glabrous climber with leaves oblong or sub-obovate-oblong, obscurely and obtusely acuminate or obtuse, rounded at the base, 2-4 inches long,  $\frac{1}{2}$ -1 $\frac{1}{2}$  inches broad. Corymbs small, few-flowered, dense, glabrous, very shortly peduncled or sub-sessile, much shorter than the leaves. Calyx slightly over 1 line long, glabrous. Corolla 2 $\frac{1}{2}$ -3 $\frac{1}{2}$  lines long, lobes oblong, obtuse 4 $\frac{1}{2}$ -5 $\frac{1}{2}$  lines long. Ovary glabrous. Fruit globose, 1 $\frac{1}{2}$ -1 $\frac{3}{4}$  inch diameter. Said to yield india-rubber.

**L. Petersiana**, Dyer. Scandent, hanging by sensitive inflorescences; young parts pubescent; leaves elliptic to elliptic-oblong, sub-acute or obtuse at both ends, 6-10 c.m. long, 3-5 c.m. broad, at first pubescent. Panicle peduncled, bearing clusters of many sessile flowers at the ends of short spreading or recurved rusty-pubescent branches. Calyx about 1 line long. Corolla white, scented, 8-13 lines long in bud; tube 3 to 4 $\frac{1}{2}$  lines long, lobes 6-8 lines long, curled-ciliate. Fruit globose, up to 2 $\frac{1}{2}$  inches in diameter, finely velvety. Zambesia.

**L. Monteiroi** (Dyer M.S.), Stapf. A rambling shrub from Delagoa Bay, described in "Flora Capensis" as having oblong to lanceolate-oblong leaves 4-6 c.m. long, 2-2.5 c.m. wide, shortly petioled; panicle peduncled, bearing 2-3 dense clusters of sub-sessile flowers at the ends of spreading or recurved branches; corolla white, sweet-scented, up to 4 c.m. long in bud; tube 2 c.m. long, slightly inflated just above the calyx. Fruit yellow, about the size of a small orange. Possibly this is the same as what is described above as *L. florida*.

**L. Klaineri**, Pierre. Is also claimed in the "Annuario de Moçambique," 1908, to be one of the rubber-producing species in Mozambique district and to be used as root-rubber. I cannot say if this identification is correct. *L. Klaineri* as a west coast species belongs to the same group as *L. Kirkii*, with small flowers; it has however oblong leaves 5-6 inches long, by 1 $\frac{1}{2}$ -2 inches wide, and very large globose fruits 6-10 inches in diameter.

180. **CARISSA.** Rigid shrubs with opposite simple leaves, terminal or axillary inflorescence, and dichotomously forked branches with once or twice dichotomously forked spines in the axils of the branches or where a fork would have been but for the abortion of one part. Flowers scented, white. Calyx small, tubular, 5-parted;

corolla tubular with a spreading 5-parted white limb; stamens 5, nearly sessile; ovary 2-celled; ovules 1 or few; berry ovoid, few or 1-seeded, edible; seeds peltate, with horny bitter albumen. A small group of little economic importance.

**C. edulis**, Vahl. A straggling nearly glabrous shrub; spines simple, 2-5 c.m. long; leaves narrowly ovate, acute, up to 5 c.m. long, and 3 c.m. wide; corolla 1-2 c.m. long, limb 1-2 c.m. across. Berry globose, purple, edible, 1 c.m. diameter; or in *var.* Major 2 c.m. diameter. Magenja da Costa and Nhamacurra; also elsewhere through Tropical Africa, and in the Transvaal.

**C. grandiflora**, A. De Cand. *Vern. names*—1, Natal Plum; 4-13, Amatungula. A compact shrub 2-4 metres high; spines once or twice dichotomously forked, 3-5 c.m. long. Leaves cordate-ovate, 3-5 c.m. long, 2-3 c.m. wide, glabrous; corolla 2-3 c.m. long, limb 2-5-4 c.m. across; berry ovoid, scarlet, 3-4 c.m. long 2-3 c.m. diameter, with several peltate scabrous seeds bedded in the flesh, which is edible and also fit for use in jam-making. Frequent along the sandy coast at Delagoa Bay and in Natal; seen also in cultivation at Mutambe Sugar Estate, Inhambane, and said to be native in the district. For illustration see "Forest Flora of Cape Colony," Plate CLV, fig. 1. Often used as a hedge.

**C. arduina**, Lam. *Vern. names*—1, Yum-yum; 4, Chochuan, Hondo-hashe, and Hlabanques; 10, Cevati; 13, Beta-umtunzi. A straggling or erect shrub 1-2 metres high. Spines dichotomous, once or twice forked, 3-6 c.m. long. Leaves lanceolate to ovate or cordate, 2-4 c.m. long, glabrous. Flowers in cymes or clusters, corolla-tube 5-10 m.m. long, limb 6-7 m.m. across, fruit oblong, 1-2 c.m. long, usually 1-seeded, scarlet. Present throughout the Province.

181. **DIPLORHYNCHUS**. Trees or shrubs, with opposite exstipulate leaves, small white scented flowers in rather lax terminal panicles, and fruit consisting of 2 spreading, milky, woody follicles, each 4-seeded, the seeds nearly flat, with a membranous wing, the wing from the upper and lower seed in each valve overlapping. Calyx small, membranous, without glands and not resinous. Corolla salver-shaped, tube widened near the base and including the stamens there; carpels 2, free; style filiform; stigma depressed capitate.

**D. mossambicensis**, Benth. *Vern. name*—10, Imporocoti. A small tree, abundant everywhere in Magenja da Costa, Nhamacurra and Zambesia, also occurs northward and across to West Africa. Leaves elliptical, shortly pointed, 5-8 c.m. long, 2-5-5 c.m. wide, glabrous, shining, with numerous parallel side veins and slender petiole 1-5-2 c.m. long. Follicles each 5 c.m. long, 2 c.m. diameter, 4-seeded; seed 1-5 c.m. long nearly flat, with a membranous wing 2-5 c.m. long. Latex flows freely from the follicles when cut. Described as pubescent on the lower leaf-surface but I find it glabrous.

PLATE XCIX. B. 1, Fruiting branch; 2, Half of 1 follicle showing 1-winged seed at each end.

**D. angustifolia**, Stapf. A small tree; leaves lanceolate or lanceolate-oblong, acute at the base, shortly acuminate, 7-8 c.m. long, 2-5-3 c.m. wide, with numerous veins on each side; panicle small, loose, few-flowered. Zambesia.

182. **RAUWOLFIA**. A large genus, widely distributed, in the warmer regions having opposite or whorled leaves, flowers in terminal cymes or umbels, small; corolla shortly tubular with a small spreading 5-fid limb; ovary single, 2-celled, girt by a cup-like disc; fruit a juicy single or twin berry. There are many species in British Central Africa and German East Africa.

**R. natalensis**, Sond. *Vern. name*—13, Umjela. A glabrous deep green, shining tree, 10 metres high and up to 1 metre diameter, with whorled leaves and branches. Leaves about 4 in a whorl, widely lanceolate, acute, entire, 10-30 c.m. long, 3-8 c.m. wide, firmly coriaceous, pinninerved, petioled and tapering to the petiole. Umbels repeatedly branched, 15-20 c.m. diameter, the ultimate peduncles with many clustered almost sessile flowers. Calyx short, cup-shaped, 5-fid; corolla-tube 7 m.m. long, hairy inside, the lobes short, imbricate, convolute in bud; stamens almost sessile. Ovary single, 2-celled. Berry 2 c.m. diameter, ultimately black, 1-2 seeded, whole plant containing bitter juice, and always growing near water. For illustration see "Forest Flora of Cape Colony," plate CLVI. Found on the Maputa Lebombos, and in Nyasa-land, Shire, etc., also in Natal and Pondoland.

**R. mombasiana**, Stapf. A glabrous shrub with quadrangular young branches, leaves in whorls of 4-3, oblong or oblong-lanceolate, acute or acuminate, cuneate at the base 10-20 c.m. long, 2-5-6 c.m. wide, thinly membranous; carpels free, fruit a simple or divaricate twin drupe, drupes quite free, ovoid 1 c.m. long, red. Lower Zambesi. *Kirk*.

183. **CARVALHOA**. Dichotomously branched shrubs with thin opposite leaves, clasping petioles glandular within, and few-flowered lax panicles from the upper branch-forks. Calyx small, sepals 5, nearly free; corolla funnel-shaped, tubular below, widened at the insertion of the stamens below the middle, about 1-5 c.m. long; anthers sagittate, meeting in a cone, included. Carpels 2, almost free, ovules many in each cell, about 4 seriate.



**C. campanulata**, K. Schum. Shrub, with sessile oblong to obovate-oblong acute leaves, narrowed to the base, 5-7 c.m. long, 2-3 c.m. wide, shortly auriculate. Flower small, in few-flowered pubescent panicles. Mozambique.

184. **CONOPHARYNGIA**. Shrubs or trees, having milky juice, divaricate branches, opposite, petioled simple leaves, connate stipules forming a ring, terminal or pseudo-axillary, corymbose, cymose or paniced inflorescence, and fragrant white flowers, with almost free calyx-lobes, salver-shaped corolla, and fruit of 2 divaricate sub-globose, sometimes angled and warted very milky mericarps containing several or numerous round or irregularly-shaped seeds.

**C. ventricosa**, Stapf. (= *Tahernaemontana ventricosa*, Hochst.) Vern. name—4-13, Um-hlamba-maas. Tree 3-12 c.m. high, with glabrous, dark-green, shining, oblong-acute, entire, thinly coriaceous leaves 10-15 c.m. long, 5 c.m. wide, with a short petiole clasping the stem at the base. Inflorescence terminal, cymose, rather few-flowered. Calyx open, with rounded nearly free lobes, each having a gland at its base. Corolla white, scented, 1.5 c.m. long, 2.5 c.m. across, with the stamens inserted at the swelling near the base of the tube. Ovary apparently single with 1 central style, the ovary afterwards opening into 2 divergent fleshy rounded smooth green follicles 4 c.m. long and wide, containing many albuminous seeds bedded in pulp. Juice of the stem and especially of the fruit milky, coagulating into rubber; used by boys as bird-lime. Maputa in swamps; also Natal and Pondoland. For illustration see "Forest Flora of Cape Colony," p. 271, Plate Cl.V. fig. 3.

**C. elegans**, Stapf. Vern. names—4-8, Kahlu; and 4, In-kasi-chonga. Fruit known as *Kahlwana*. A glabrous shrub 2-4 metres high, dichotomously branched, with narrowly oblong leaves 10-20 c.m. long, 4-6 c.m. wide, rounded at both ends or tapering to and acute at both ends; side veins distinct, numerous, sub-parallel but irregular, pale on the under surface; inflorescence cymosely-paniculate, pseudo-terminal, many-flowered, 7-8 c.m. across; flower small, white; sepals almost free; corolla-tube 6-8 m.m. long, limb 6 m.m. across. Follicles divergent, 5 c.m. long, 4 c.m. deep, pointed, flattened above, with side ridges, and roughly warty. Leaves very small on fruiting branches as compared with those on vigorous branches. Fruits exceedingly milky and produced in great abundance; might be collected and the milk bled at a central factory if its rubber value is sufficiently high. Very abundant around Lourenzo Marques and throughout the M'Chopes, usually on sandy soil; present also throughout the Province.

PLATE LXXX. A. 1, Fruiting branch; 2, Large leaf from vigorous branch.

185. **VOACANGA**. Trees or shrubs, with milky juice, dichotomous branches, opposite glabrous somewhat sheathing simple entire leaves, few-flowered usually cymose inflorescence, and baccate, divergent, somewhat globose, beaked, many-seeded follicles, with rounded or irregular seeds bedded in pulp. Calyx 5-lobed, splitting off.

**V. Thouarsii**, Roem. & Sch. Vern. names—6, Kahlu-ma-chonga; 7, 8, M'geni; 10, Raka-raka, or i-raga-raga. A tree 12-15 metres high, with clean, fairly straight stem, growing in stagnant swamps, and usually crowded or gregarious. Leaves elliptical, narrowed to the short petiole, rounded at the apex, 10-15 c.m. long, 4-5 c.m. wide, with 10-12 lateral veins on each side. Cyme stout, about 3-flowered; peduncle 1 c.m. long; calyx 1 c.m. long, truncate, succulent, green; corolla rotate, 5 c.m. across, creamy-white, with 5-obcordate segments and an objectionable smell. Stamens 5, hastate, sessile, 5 m.m. long, set in the throat of the corolla and meeting over the clavate stigma. Fruit of 2 globose dehiscent follicles, each 5 c.m. diameter, with a smooth green skin spotted white and containing many compressed seeds 6-8 m.m. long. Swamps in M'Chopes, Inhambane, Magenja da Costa, and Nhamacurra. Occurs also in Natal, German East Africa and Madagascar.

PLATE LXXXI. 1, Branch, with cymes; 2, Corolla-tube opened, showing stamens and pistil; 3, Stigma,  $\times 5$ ; 4, Anther,  $\times 5$ ; 5, Fruit; 6, Seeds; 7, Tree, general aspect.

**V. lutescens**, Stapf. A shrub, having sessile, elliptic or elliptic-oblong, acute or somewhat acuminate leaves 10-20 c.m. long, 5-10 c.m. wide, somewhat pubescent below. Inflorescence dichotomously corymbose, many-flowered, more or less pubescent. Corolla greenish-yellow, tube 1 c.m. long, tomentose, limb rotate, 3 c.m. across. Fruits ovoid-globose, oblique, 5 c.m. long, mottled. Lower Zambesi. Shire, &c.

Another species of Voacanga or Conopharyngia occurs in Magenja da Costa, known as, 10, Moorangaranga, having sessile leaves 20-30 c.m. long, 10-12 c.m. wide, the blades of opposite leaves connate round the stem, and large fruits like those of *C. elegans*.

Another species, probably belonging also to one of these genera, occurs near Manjacaze, Gaza, as a bush 1-2 metres high, with lanceolate petiolate leaves 5-7 c.m. long, 1-2 c.m. wide, and is known there as Nkahluchonga.

186. **HOLARRHENA**. Deciduous trees or shrubs, with opposite or sub-opposite herbaceous, exstipulate leaves, many-flowered terminal or pseudo-axillary corymbs of white fragrant flowers, fruit of 2 divergent, slender, terete follicles, and seeds tailed by a tuft of hairs. Sepals 5; corolla salver-shaped, 5-lobed; anthers not sagittate; carpels 2, free; ovules numerous, in many lines.

**H. febrifuga**, Klotzsch. *Vern. names*—2, Quina; 16, Kumbanzo. A small tree; young parts hairy, afterwards more or less glabrescent. Leaves elliptic or oblong, 5-15 c.m. long, 4-8 c.m. wide, shortly petiolate. Corymbs more or less hairy; calyx small; corolla-tube 2 c.m. long, limb 3-4 c.m. across. Follicles slender, 20-30 c.m. long; seeds 2 c.m. long, tails 3 c.m. long. Zambesia and northward. Said to be used as a tonic and febrifuge.

187. **STROPHANTHUS**. Monkey-ropes, widely scandent, or sometimes in the absence of support sub erect. Leaves opposite or ternate, exstipulate, inflorescences terminal on short side branches, corymbose, few-flowered or 1-flowered. Corolla campanulate, 5-lobed, the lobes usually with very long filiform tails; 2 appendages in the throat between each pair of corolla-lobes. Carpels 2, free; ovules numerous, in many rows. Follicles oblong, lanceolate or cylindrical, long, divergent; seeds with a tuft of hairs at the base and a terminal awn, beautifully plumose at the top. Mentioned here on account of the beautiful and curious flowers and seeds, and the medicinal properties of some species.

**S. Kombe**, Oliv. *Vern. name*—16, Komhi. Leaves elliptic or ovate-elliptic, acute, 8-9 c.m. long, 4-5 c.m. wide, tomentose when young; cymes terminal, few-flowered, hispid. Calyx 2 c.m. long, hispid; corolla nearly white, the cylindrical part as long as the wider funnel-shaped part; tails 8-12 c.m. long with a wide base; appendages very short, papillose; follicles 20-40 c.m. long, 2-2.5 c.m. diameter; awn up to 15 c.m. long, including the plume. Zambesia and northward. The seeds have been exported by the Companhia de Mozambique from about Gorongoza, on the Zambesi for their medicinal qualities and are also said to be used by the natives for poisoning arrows. Several other species have seeds used in the same way.

**S. grandiflorus**, Stapf. A straggling bush or creeper, common on the Polana and elsewhere near Lourenço Marques, and well worth cultivation for its very curious and pretty flowers. Leaves 5 c.m. long, 2 c.m. wide, widely lanceolate, the young leaves appearing with the flowers. Calyx 5-parted, each segment 2 c.m. long. Corolla-tube campanulate, pubescent, 3 c.m. long, of which only 3-4 m.m. is narrow, the remainder being up to 2 c.m. wide. Segments 10-15 c.m. long, folded inward and so tail-like from a wide base. Appendages lanceolate, 1.5 c.m. long. Follicles 10-25 c.m. long, divaricate and boat-shaped when open. Seeds 1 c.m. long, with a 10 c.m. tail, including plume.

PLATE LXXX. B. 1, Flowering branch; 2, Calyx; 3, Pistil,  $\times 3$ ; 4, Lower part of tube opened, showing stamens united by anthers; 5, One stamen,  $\times 3$ ; 6, Fruit (much reduced); 7, Seed and tail (much reduced).

**S. Petersianus**, Klotzsch. A glabrous shrub, with ovate leaves 3-6 c.m. long, 2-4 c.m. wide; cymes few or 1-flowered; corolla-tube 2 c.m. long, of which 5 m.m. is narrow; tails purple 5-8 c.m. long; segments subulate, 5-8 m.m. long. Appendages subulate, 5-6 m.m. long. Zambesia.

**S. Courmonti**, Sacleux. A rambling glabrous shrub, with corky lumps at the nodes. Leaves elliptic to ovate, 6-9 c.m. long, 3-4 c.m. wide; cymes few or 1-flowered; calyx short; corolla violet outside, white inside, scales yellow; tube 3 c.m. long, of which 1 c.m. is narrow; lobes ovate-lanceolate, not tailed, 3-4 c.m. long; appendages lanceolate, 5-6 m.m. long. Follicles 25 c.m. long. Zambesia.

188. **MASCARENHASIA**. Trees, with opposite, exstipulate, simple leaves; pink or purple terminal flowers, 1 or few together; linear, divaricate, oblong or linear, terete follicles, and linear oblong seeds with a tuft of hairs at one or both ends. Calyx small, segments almost free; corolla salver-shaped, 5-lobed; carpels 2, free; ovules numerous.

**M. elastica**, K. Schum. *Vern. name*—10, Imperati. A tall glabrous tree growing along streams throughout Magenja da Costa and Nhamacurra, and present also in Sofala and Manica, where Mr. Johnston has its qualities under observation. Seldom over 15 c.m. diameter of stem. Leaves oblong-elliptical, 10-12 c.m. long, 2.5-3 c.m. wide, shortly petioled, somewhat narrowed below, and tapering to the 1 c.m. petiole. Inflorescence terminal, but by the development of one upper bud the fruit often appears lateral. Follicles 8-12 c.m. long, 1.5-2 c.m. diameter, bluntly 3-angled or cylindrical, green, glabrous, smooth, opening along their inner faces, many-seeded; the seeds flat, brown, 1.5-2 c.m. long, 2-5 m.m. wide, with a large tuft of brown hairs at the upper end and a small tuft at the lower end. Yields rubber freely and produces about half of the rubber exported from where it grows, the Banyan traders giving the natives the same price for it as for Landolphia rubber, which is about equivalent to a penny for 4 balls. The tree is cut one day and on the next day the rubber is collected direct on to sticks. Sim 6021.

PLATE XCIX. A. 1, Branch and follicles (one open); 2, Seed.

**ADENIUM** and **PACHYPODIUM** are 2 closely related genera, characterised by having the leaves spirally arranged and the stem succulent, and distinguished by the former having no spines while the latter has stipular spines. Both have the corolla funnel-shaped or campanulate, 4-5 c.m. long, and in local species bright

pink and well worth cultivation. Both have 2 long spreading follicles and seeds with a tuft of hairs at each end. Some of the species have huge unshapely succulent trunks, several feet in diameter, from which branches rise irregularly, but they have no forestal value. *A. multiflorum*, Kl., *vern. name*—*lioku-boku*, is frequent at Umbeluse and in Maputa, and I was informed that the root put in water kills fish. *Pachypodium Saundersii*, N. E. Brown, 2-3 metres high grows in rocky places along the Swazi-land Railway and was also seen near the Inharrime River.

## FAMILY XLVII.—LOGANIACEÆ.

Trees, shrubs or herbs, having opposite simple leaves, interpetiolar stipules or lines instead, paniculate or cymose inflorescence, and regular hermaphrodite flowers. Calyx 4-5 lobed or parted. Corolla hypogynous, rotate, with a long or short tube and 4-5 parted limb. Aestivation valvate or imbricate. Stamens from or near the throat of the corolla, exserted or included, alternate to the segments of the corolla. Ovary 1-2 celled, superior, with a simple style and capitate stigma, with the stigmatose surface terminal. Ovules solitary, few or numerous; fruit capsular and 2-celled, drupaceous or baccate; in the latter case with the seeds immersed in pulp. Seeds albuminous, mostly peltate. A considerable Family, mostly tropical, often poisonous, and in some cases medicinal.

189. **STRYCHNOS.** Calyx 5-lobed; corolla 5-lobed, valvate in bud, with a short wide tube; stamens 5, exserted or included; ovary 1-2 celled, with a subulate style and capitate stigma; ovules few or many; berry 1-2 seeded without shell, or many-seeded in a shell containing pulp; seeds somewhat flattened, with a scar along 1 side; leaves simple, entire, 3-veined; cymes axillary or terminal. A large and widely distributed genus of trees and shrubs, in which the poisonous agent *strychnia* is usually present locally, but not distributed throughout the tree.

**S. Henningsii**, Gilg. *Vern. names*—1, Hard Pear; 13, 15, Umnonono. A valuable timber tree 12-20 metres high, and up to 60 c.m. diameter, with a straight clean stem and rather compact crown. Leaves opposite, 3-5 c.m. long, 2-4 c.m. wide, ovate-acuminate, shortly petioled, glabrous and shining, distinctly 3-nerved, or sometimes 5-nerved. Panicles cymose, axillary, few-flowered, with bracts at each fork. Flowers 5-7 m.m. across, white; calyx pubescent with short blunt lobes; corolla-tube very short, the lobes glabrous, hooded, with the exserted stamens rising from between the lobes. Pistil short, ovoid; ovary 2-celled: cells few-ovuled; fruit an orange red berry, 1-2 seeded, oblong, glabrous, sessile, 1-5 c.m. long, 1 c.m. diameter; seeds not velvety, peltate from the middle of the suture, irregular in form, but with a scar down one side, and not unlike coffee beans. Present in the coast scrub at Delagoa Bay and M'Chopes, and on the Lehombo Mountains, but not seen growing into the fine timber it makes in Natal and Cape Colony. For uses, &c., see "Forest Flora of Cape Colony," p. 273, Plate LXXVII.

PLATE LXXVI. B. 1, Flowering branch; 2, Fruit.

**S. spinosa**, Lam. *Vern. names*—1, Kafir Orange; 4, Sala, Insala, Mus-salo; 6, Tamba or Ramba; 10, Marocobai, Morogovali; 13, Umhlala. A small evergreen tree or shrub, having decussate short side branches often ending in a spine, and obovate 3-5 nerved variable, glabrous leaves 2-5 c.m. long, 2-3 c.m. wide, usually rounded at the point or bluntly pointed, tapering to the short petiole, pale under and often with the 2 sides from the midrib more or less infolded upon one another. On young vigorous shoots, the leaves are often ovate or rounded. Cymes mostly terminal on short twigs, paniculate, rather few-flowered. Flowers mostly 5-merous; *calyx-lobes long, subulate*. Corolla-tube and segments glabrous, but throat bearded by a complete ring of hairs half as long as the segments. Stamens rising from the base of the corolla-tube, and anthers connected by an interwoven woolly mass. Ovary 1-celled, ovules numerous surrounding a central free placenta. Fruit the size of an orange, or larger, deep green when young, yellow when ripe; with hard shell and numerous flat seeds lying in acidulous edible pulp. Tree seldom of timber size; abundant throughout the Province, extending to Natal and Cape Colony, as also to other parts of Tropical Africa and Madagascar. For illustration see "Forest Flora of Cape Colony," 274, Plate CXI., fig. 2.

**S. Gerrardii**, N. E. Brown. *Vern. names*—4, Quaqua, Cua-cuan or Inquaqua; 10, Muteme or Mteme. A small tree, 3-10 metres high, without thorns, and with exceedingly variable leaves, usually more or less elliptical, oval, oblong obovate-oblong or rounded, sometimes even widely linear, 2-10 c.m. long, 1-3 c.m. wide, obtuse, usually narrowed downward, 3-5 veined, densely pubescent at first, glabrescent and somewhat glaucous with age on the upper surface, and almost sessile. Inflorescence in axillary cymes or fascicles nearly sessile; flowers 4-merous; calyx pubescent, the lobes short and oblong; corolla glabrous outside and with a ring of hairs inside. Ovary said to be 2-celled; fruit 1-celled, globose 5-7 c.m. diameter, glaucous, glabrous often spotted, with a hard shell and numerous flat seeds lying in acidulous edible pulp. Abundant from Natal to Inhambane, especially on the sandy soils; present but less plentiful in Zambesia (tropical).

PLATE LXXVI. A. 1, Branch with flowers and fruit; 2, 3, 4, Leaf-forms.



**S. suberosa.** (New species.)<sup>1</sup> *Vern. name*—10, Morebo; but several other trees have very similar names. A small tree having pubescent leaves; on old wood cordate-ovate, abruptly pointed, 3-7 nerved, 5 c.m. long and wide; on young wood ovate or ovate-lanceolate, from 3 c.m. long and 1.5 c.m. wide upward, on 1 c.m. petioles, and often bearing recurved spines 1.5-2 c.m. long in the axils. Flowers not seen. Fruit 6-8 c.m. diameter, yellow when mature. Bark corky, ridged, on the main stem 2.5 c.m. deep, and cork showing even on the twigs. This has the whole habit of *S. spinosa* but the bark is very different. Seen only in the forests of Magenja da Costa near Maquebella. Sim 6013.

PLATE LXXVI. C. 1, Corky stem and old leaf; 2, Twig with spines and small leaves; 3, Fruit.

190. **NUXIA.** Evergreen trees having simple opposite or whorled leaves, paniculate-cymose inflorescence, 4-merous flowers, and dry capsular fruits. Calyx 4-toothed, tubular; corolla shortly tubular, limb 4-fid, the tube spilling off above the base after the flower opens; stamens 4, exserted; ovary 2-celled; ovules many; style simple; capsule 2-valved, many-seeded, septical. A small African genus.

**N. oppositifolia,** Bth. *Vern. name*—15, Simalashant. Often an upright shrub, occasionally a tree 10-20 metres high, 60 c.m. diameter of stem, and with useful close-grained timber. Twigs slender, leaves linear-lanceolate, 7-8 c.m. long, 5 m.m. to 1.5 c.m. wide, often erosely toothed, puberulous and viscid when young, glabrous when old. Inflorescence terminal and in the upper axils, viscid, cymose-corymbose, dichotomous; flowers very small. Frequent in the Maputa Lebombos, below Estatuene. Occurs also in Natal.

PLATE LXXVII. B.

#### FAMILY XLVIII.—BORAGINEÆ.

A large Family of herbaceous plants, but including also a few trees and shrubs. Flowers hermaphrodite, regular or almost so. Calyx 5-lobed, short. Corolla campanulate or rotate, 5-lobed; stamens as many (sometimes 1 abortive), at the top of the corolla-tube, exserted. Ovary superior, in local trees entire with a terminal style and producing a fleshy 4-celled, 4-seeded drupe. Seeds erect. Stems terete, with alternate simple exstipulate leaves and paniculate or cymose inflorescence. The herbaceous genera vary from the above in having mostly 4-lobed ovary, with gynobasic style.

191. **CORDIA.** Calyx irregularly 3-5 lobed, campanulate; corolla rotate, with a short tube and 5-6 parted limb; stamens as many as the corolla-limb, but sometimes not all perfect. Ovary 4-celled with a twice 2-fid style. Fruit a globose drupe with 4 pyrenes; stones hard, seeds exalbuminous, erect, oblique; cotyledons plicate. A large and mostly tropical genus, having alternate or sub-opposite simple leaves, and flowers in terminal panicles or cymes.

**C. caffra,** Sond. *Vern. names*—4, Kokoshuan; 6, Impsetu. A large or small tree with whitish bark, soft sapwood, and durable heartwood. Leaves 5-10 c.m. long, 3-4 c.m. wide, on slender 5 c.m. petioles, exceedingly irregular as to shape and margin, but usually ovate-lanceolate, narrowed to both ends, deeply and irregularly toothed, and densely but minutely yellow-pubescent when young, afterwards nearly glabrous. Calyx 3-lobed in flower, but accrescent and 4-5 lobed in fruit; corolla nearly regular, but 2 lobes somewhat connate; 4 stamens equal, the fifth reduced or absent; ovary 4-celled, each cell 1-ovuled. Fruit a yellow globose drupe, 1.5 c.m. in diameter, with 4 hard pyrenes. Cymes terminal when in flower, but by the production of a branch directly under them becoming lateral afterwards. Frequent at Umbelusi and found occasionally north to Inhambane; more common in Natal and eastern Cape Colony. For illustration see "Forest Flora of Cape Colony," 280, Plate CXVI.

192. **EHRETIA.** Calyx 5-parted; corolla-tube very short, with 5 rather longer spreading lobes, imbricate in bud. Stamens 5, equal, placed near the top of the tube, exserted. Ovary entire, globose, with a terminal slender 2-fid style. Drupe globose, with 4 pyrenes. Seed erect; albumen scanty; cotyledons flat. A considerable genus of trees and shrubs, tropical and sub-tropical.

**E. hottentotica,** Burch. *Vern. names*—4, Jabeakwa; 13, Umhleli. A shrub or small tree 2-5 metres high, sometimes erect in habit, but more frequently with drooping whitish branches. Very variable in size of leaf and in pubescence or in the absence of it. Leaf 3-8 c.m. long, 2-4 c.m. wide, oval or obovate, entire, pubescent or glabrous, with scabrid margin and short petiole. Cyme corymbose, many-flowered, conspicuous; corolla usually blue or lilac colour, lighter inside than outside,

<sup>1</sup> *Strychnos suberosa.* (Sp. nov.) *Arbor parva, S. spinosa similis; ramis pluribus recurvis axillaribus 1.5-2 c.m. armata; cortice suberoso, rugoso, crasso; foliis breviter petiolatis, pubescentibus, ramulorum ovatis vel ovato-lanceolatis, 3 c.m. longis, 1.5 c.m. latis; ramorum vetustiorum cordato-ovatis, abrupte acuminatis, 3-7-nerviis, 5 c.m. longis et latis; floribus haud visis; fructibus 6-8 c.m. diam., flavis.* In silvis per Magenja da Costa. Sim 6013. Tab. LXXVI. C.

sometimes nearly white. Drupe orange or red when ripe, 1 c.m. diameter. Frequent south of the Limpopo and occurs occasionally in M'Chopes and Gaza. Common in Natal and Cape Colony. For illustration see "Forest Flora of Cape Colony," 279, Plate CXVI. fig. 2.

**COROLLIFLORÆ. GROUP II. SECTION 2.**

Corolla more or less irregular. Perfect stamens usually 4.

**FAMILY XLIX.—BIGNONIACEÆ.**

Trees, shrubs and scandent shrubs with (in local species) opposite and pinnate leaves and showy flowers in terminal or axillary racemes or panicles. Calyx bell-shaped, 5-6 lobed; corolla tubular, hypogynous, usually oblique at the mouth, and with a 5-6 lobed spreading limb, the 2 upper segments more connate than the others, imbricate in bud. Stamens 4, didynamous; ovary 2-celled, many ovuled. Style slender, with stigma of 2 short flattened plates. Fruit a leathery capsule, 2-celled, 2-valved, the septum at right angles to the valves and remaining with the winged seeds attached after dehiscence; or a woody or pulpy indehiscent fruit with many seeds. Seeds exalbuminous.

193. **KIGELIA.** Fruit fleshy or woody, indehiscent; seeds wingless; cotyledons fleshy. Leaves pinnate; flowers paniced, corolla sharply 5-lobed; stamens 4, didynamous. Monotypic.

**K. pinnata**, De Cand. *Vern. names*—1, Cucumber tree; 2, Mundiuro or Im-bundero; 4, Fungura or Fongosi; 10, Togo-rogo, Umtuberubu or Mluku-tungwa; 13, Umzingula or Um-fongote. A bushy tree, 7-10 c.m. high with a wide crown and a short clean bole sometimes 1 metre diameter, and considered one of the toughest indigenous timbers. Leaves scattered, sub-opposite, or often in whorls of 3; impari-pinnate, 15-30 c.m. long; of 7-9 leaflets, which exceedingly variable in form, but usually obovate-oblong, rounded and mucronate at the apex, rounded, cordate or sometimes cuneate at the base, shortly petiolate or almost sessile, 7-10 c.m. long, 3-5 c.m. wide, of firm brittle consistence, glabrous and light green above, paler or sometimes almost white below, with the midrib and about 6 side veins on each side standing in the relief and sometimes coloured brown. Inflorescence a loose raceme 20-60 c.m. long, 6-12 flowered, axillary or from old wood, each peduncle 3-5 c.m. long, subtended by a short bract. Calyx 3 c.m. long, 3-4-5 fid, corolla campanulate, brown, somewhat arched above and descending below, 7-8 c.m. wide; upper lip 2-lobed; other 3 lobes separate; stamens 4, shortly exserted; style as long, stigma flattened out laterally. Fruit oblong-cylindrical, 15-30 c.m. long, 5-8 c.m. diameter, woody externally, with many seeds bedded in nearly solid pulpy substance. Abundant near Lourenço Marques and in Maputa and Marracuene; present but not abundant from the Limpopo to Inhambane, present but scarce in the forests of Quelimane, Magenja da Costa and Nhamacurra. See "Natal Plants," Plates 386, 387.

PLATE LXXXII. 1, Tree, general aspect (reduced); 2, Leaf; 3, Raceme; 4, Fruit (much reduced).

194. **TECOMA.** Sub-erect or more or less scandent shrubs, having opposite impari-pinnate leaves and terminal inflorescence with large, showy, coloured flowers. Calyx bell-shaped, 5-toothed; corolla-tube widening upward, the limb spreading, 5-lobed, the 2 upper lobes more connate than the others. Stamens 4, didynamous, with a rudimentary fifth; anther cells connate at the top only, and spreading widely. Capsules 2-celled, 2-valved, the septum at right angles to the valves. Seeds winged. A considerable and widely distributed genus.

**T. capensis**, Lindl. (= *Tecomaria capensis*, Spach.) *Vern. names*—4, Longoloti; 6, Insutihuti. A scandent shrub which in the sandy tracts of Zondemala and M'Chopes straggles on top of everything and makes a gorgeous display of its red flowers, which are 5 c.m. long, angular when young and with 2 knees on each angle, the limb spreading, 5-lobed; the 2 upper somewhat connate. Stamens longer than the tube, exserted. Capsule 10 c.m. long, 1 c.m. wide; seeds flat, winged. Leaves pinnate, about 7-foliate; the leaflets ovate, 1-3 c.m. long, bluntly pointed and 4-7 toothed on each side. An ornamental garden creeper, but of no forestal value. See "Forest Flora of Cape Colony," 283, Plate CXIX. fig. 3; and "Natal Plants," Plate 272.

195. **SPATHODEA.** Trees or shrubs, with opposite impari-pinnate leaves, terminal racemes of showy flowers, obliquely rotate flowers; and dehiscent long, flat, leathery capsules containing many winged seeds.

**S. alba.** (New species.)<sup>1</sup> *Vern. names*—5, 6, Insanye; 7, Dane or Idane; 10, Naguro. Leaves opposite, impari-pinnate, of about 4 pairs of leaflets and the terminal one. Leaflets 5-10 c.m. long, ovate, obovate or elliptical, almost sessile, rounded or blunt at the apex, entire, undulated, glabrous. Raceme terminal, up to 45 c.m. long, many-flowered; only about 3 flowers open at a time; these sweetly scented, white, showy. Peduncles 5-10 m.m. long; calyx 2-3 c.m. long, split down 1 side; corolla tube 4-5 c.m. long, cylindrical; limb rotate; lobes 2-5 c.m. long, 2 c.m. wide, with wavy margins. Pistil 4 c.m. long, slender, with 2 flat stigma lobes. Capsule linear, 30-60 c.m. long, 2-2-5 c.m. wide, flat, 2-3 m.m. diameter, pubescent, many-seeded; the seeds winged at each side, 4 c.m. wide, 1 c.m. long. A small tree, frequent in lower Gaza, M'Chopes and Inhambane; also present in the forests of Magenja da Costa. So strongly scented that one administratador thought a perfume industry might arise to utilise it. Sim 5244.

PLATE LXXV. B. 1, Top of raceme; 2, Leaf; 3, Capsule; 4, Seed.

#### FAMILY L.—VERBENACEÆ.

Herbs, shrubs or trees, with simple or digitate, usually opposite or whorled leaves, and terminal or axillary definitely cymose panicles of small flowers, usually white in the ligneous species. Flowers hermaphrodite; corolla regular or more or less 2-lipped, gamopetalous, 4-5 lobed; stamens 4, exserted, more or less didynamous; ovary superior, 4-2 celled; ovules 1-2 in each cell; fruit fleshy, 4-seeded, with hard pyrenes, or leathery and fewer-seeded. A large Family, mostly tropical and largely herbaceous, including many garden flowers.

196. **CLERODENDRON.** Calyx widely campanulate, 5-lobed, somewhat accrescent in fruit; corolla-tube cylindrical, with 5 sub-equal lobes; stamens 4, exserted, incurved in bud; ovary imperfectly 4-celled, with 1 ovule in each. Drupe globose, fleshy, with 4 (or by abortion fewer) 1-seeded pyrenes. Seeds exalbuminous. Leaves simple, entire, opposite or whorled; cymes in the axils of the upper leaves, making a terminal corymb. A large and widely dispersed genus; there are many species from German East Africa, while in this Province several herbaceous species were seen in flower but not collected.

**C. glabrum**, E. Mey. *Vern. names*—4, Vumbane, Invumbane and Monuhelobeba; 6, Inzumbain, Ntchepovane; 10, Nequaku, Mukamba; 15, Mwenambiba. A small and often bushy evergreen tree, 5 metres high, 15-30 c.m. stem diameter. Leaves usually in whorls of 3 or 4, sometimes opposite, ovate or ovate-lanceolate, entire, glabrous, shining, acute, gland-dotted beneath, 5-10 c.m. long, 2-5 c.m. wide, with 2-3 c.m. peduncles. Cymes in the axils of the upper leaves, making a dense, flat, corymbose, terminal panicle; calyx sharply 5-lobed; corolla-tube 8 m.m. long, slender, with spreading, sub-equal, 5-fid limb; stamens 4, much exserted, standing in pairs. Ovary imperfectly 4-celled, cells 1-ovuled; style long, subulate, bifid at the stigma. Fruit a globose drupe 1-1-5 c.m. diameter, 1-4 seeded; usually divides easily into 2 bony pyrenes, of which 1 is fertile. Frequent throughout the Province, and also in Natal and Cape Colony. See "Forest Flora of Cape Colony," 286, Plate CXXII.

PLATE XCVIII. A. 1, Flowering branch; 2, Flower,  $\times 2$ ; 3, Fruit.

The other species of *Clerodendron* are unknown to me, and not of forestal importance; but the following synopsis, extracted from the "Flora of Tropical Africa" and "Flora Capensis" in reference to such species as are recorded from this Province may be of use.

**C. Rehmanni**, Gürke. A shrub with opposite ovate or ovate-lanceolate pubescent leaves, narrowed to each end and not gland-dotted; corolla-tube 1-1-5 c.m. long; and other characters as in *C. glabrum*. Delagoa Bay.

**C. ovale**, Klotzsch. A shrub, 6-7 feet high. Leaves 2-3 nate, petioled, oblong, obtuse, entire, cuneate at the base, 1-2 inches long, pubescent, gland-dotted. Cymes few-flowered, terminal and axillary. Calyx-tube  $\frac{1}{2}$  inch long. Rio de Sena, *Peters*.

**C. tricholobum**, Gürke. A shrub. Leaves ovate, 2-3 inches long, velvety on both sides; cymes long-peduncled, lax, axillary; corolla-tube  $\frac{1}{2}$ - $\frac{3}{4}$  inch long, glandular-pubescent. Mozambique, *Stuhlmann*, 444.

**C. capitatum**, Sch. and Th. An erect shrub with hairy branchlets. Leaves opposite, oblong or obovate-oblong, acute,  $\frac{1}{2}$ -1 foot long, nearly glabrous above, pubescent below. Flowers in dense sessile terminal heads 6-9 inches diameter. Corolla white, tube slender, 3-4 inches long; stamens curved, twice as long, or more. Zambesia and Mozambique.

<sup>1</sup> *Spathodea alba*. (Sp. nov.). Arbor parva; foliis oppositis, imparipinnatis; foliolis 4-jugis, ovatis, obovatis vel ellipticis, 5-10 c.m. longis, subsessilibus, apice obtusis vel rotundatis, integris, undulatis, glabris; racemis apicalibus, multifloris, 45 c.m. longis; floribus odoratis, albis, pulchris; pedunculo 5-10 m.m. longo; calyce 2-3 c.m. longo, uno latere fisso; corollae tubo 4-5 c.m. longo, cylindrico; limbo rotate, lobis 2-5 c.m. longis, 2 c.m. latis; pistillo 4 c.m. longo, tenui, stigmatibus 2 planis; capsula lineari, 30-60 c.m. longa, 2-2-5 c.m. lata, compressa, 2-3 m.m. crassa, pubescente; seminibus multis, alis lateralibus praeditis, 1 c.m. longis, 4 c.m. latis. Frequens in Gaza, M'Chopes et Inhambane; etiam crescit in silvis per Magenja da Costa. Sim 5244. Tab. LXXV.



- C. incisum**, Klotzsch. An erect shrub. Leaves 2-3 nate, oblong-lanceolate, deeply inciso-pinnatifid, 3-4 inches long, half as wide at the middle, pubescent on both sides. Flowers in a terminal sessile head. Corolla white, tube slender, glabrous,  $2\frac{1}{2}$ -3 inches long; filaments red, 2 inches long. Kerimba Islands, *Peters*. Rios de Sena, *Peters*.
- C. myricoides**, R. Br. An erect shrub. Leaves 2-4 nate, oblong, acute, deeply toothed, cuneate at the base, 2-6 inches long, glabrous above, pubescent below. Cymes lax, few-flowered, forming a short terminal panicle. Corolla-tube very short, upper lobes white,  $\frac{1}{2}$ -inch long; lower lobes  $\frac{3}{4}$ -inch long, pale-blue. Kongone River, *Kirk*; and the more hairy *var. discolor*, Rios de Sena, *Peters*; also Natal, Transvaal, &c.
- C. lanceolatum**, Gürke; an herb or shrub. Leaves oblanceolate, 2-3 inches long, toothed above, cuneate below, pubescent, and with offensive smell. Cymes few-flowered, sub-terminal; corolla white, tube sometimes above an inch long. Lower Zambesi.
197. **HOLMSKIOIDIA**. Shrubs, with opposite simple leaves; axillary or terminal cymes of small flowers; accrescent spreading, 5-fid coloured calyces, 5-lobed short incurved corolla; 4 stamens, entire or obscurely 4-lobed 4-celled ovary and solitary ovules, attached laterally. Fruit containing 1-4 bony pyrenes.
- H. tettensis**, Vatke. An erect shrub without spines. Leaves obovate 2-5-3 c.m. long, entire or with few large teeth, pubescent. Cymes few-flowered, terminal on branchlets. Calyx finally 2-5 c.m. wide. Fruit villous, 4-lobed at the apex. Zambesia.
- H. spinescens**, Vatke. An erect spinescent shrub. Leaves 2-4 c.m. long, oblong-cuneate, entire, pubescent. Cymes lax, few-flowered, terminal on branchlets. Calyx finally 2-5 c.m. across. Corolla 1-5 c.m. long; fruit villous, 4-lobed. Zambesia.
- H. mucronata**, Vatke. An erect spinescent shrub. Leaves ovate, 1-3 c.m. long, rounded, pubescent. Cymes axillary; calyx coloured, finally 2 c.m. wide. Zambesia.
198. **PREMNA**. Shrubs, trees or stragglers with opposite or whorled dotted simple leaves; cymose-paniculate terminal inflorescence; minute flowers; accrescent calyx; short 4-lobed corolla; 4 stamens; 1-2 celled ovary; 4 ovules, and small globose 4-celled drupe.
- P. serratifolia**. Linn. An erect shrub, with opposite, oblong, crenate or entire glabrous leaves, 7-15 c.m. long; large corymbose panicle, corolla-tube 4 m.m. long, limb 4-lobed; stamens included; drupe purple, 5-6 m.m. diameter. Zambesia and northward.
- P. viburnoides**. A. Rich. An erect shrub, with ovate or subcordate, cuspidate, entire leaves 5-8 c.m. long, glabrescent above, pubescent below; many-flowered terminal cymes; small ovate bracts; corolla-tube as long as the calyx; drupe black, 3 m.m. diameter, globose. Lower Shire Valley, *Kirk*.
- P. senensis**. Klot. A small tree, with ovate or oblong, acute, entire leaves, 2-5-5 c.m. long, cuneate at the base; many-flowered, dense, terminal cymes; subulate bracts; corolla-tube rather longer than the calyx. Lower Zambesi.
199. **VITEX**. Corolla widely campanulate, 5-lobed, accrescent in fruit. Corolla shortly tubular, somewhat 2-lipped, the 2 upper lobes shorter than the other 2 and outside them in bud. Stamens 4, didynamous; ovary 4-celled, with 1 ovule in each cell. Drupe enclosed in the calyx, leathery or fleshy, with a hard 4-celled, 4-seeded stone. Seeds exalbuminous. Leaves simple or digitately compound, usually opposite. Trees or shrubs, mostly tropical, many species additional to those of this Province being found in German East Africa and in British Central Africa. 58 species are described in the "Flora of Tropical Africa," and 9 in the "Flora Capensis."
- V. villosa**. (New species.)<sup>1</sup> *Vern. name*—10 Imporo. A medium sized tree frequent from Quelimane northward, with opposite, 5-foliate digitate leaves on thick branches; peduncles 7-15 c.m. long, pubescent; leaflets sessile, obovate, acute or blunt, 8-12 c.m. long, 6-9 c.m. wide; the leaflets pubescent above, pale and densely villose below, the young parts of the stem closely hairy. Cyme as long as the leaves, axillary many flowered; fruit 2 c.m. long, nearly as wide, fleshy, set in the enlarged calyx and alleged to be edible. Sim 5572.

## PLATE LXXVIII. B.

<sup>1</sup> *Vitex villosa*. (Sp. nov.) Arbor; cauli juveni dense hirta; ramis crassis folia opposita digitata gerentibus; petiolis 7-15 c.m. longis pubescentibus; foliolis 5, sessilibus, obovatis, acutis vel obtusis, 8-12 c.m. longis, 6-9 c.m. latis, folioli pagina superiore pubescente, inferiore pallida et dense villosa; inflorescentia cymosa foliis aequa, flores plures gerente; fructu 2 c.m. longo, et tantum non lato, carnoso, calyce dilatato circumdato. Frequens a Quelimane septentrionem versus. Sim 5572. Tab. LXXVIII. B.

- V. Carvalhi**, Gürke. *Fern. names*—10, Imporicoti; 15, Umbindong. "A shrub or tree; branchlets glabrous. Leaves 5-foliate, petiole very long; leaflets distinctly stalked, elliptical or lanceolate-obovate, 3-4 in. long, acute or cuspidate; *irregularly deeply toothed*, membranous, glabrous on both surfaces. Cymes lax, axillary, with a very long peduncle. Calyx campanulate, tomentose, 5-toothed; corolla-tube pubescent. Mozambique, *Carvalho*." Abundant in the kloofs below Estatuene. Maputa (extra-tropical); also near Bajan, Magenja da Costa (tropical).
- V. Cienkowski**, Kot. & Pey. *Fern. name*—10, Imporo-coti. A tree, 15 metres high; branchlets glabrous, stout. Leaves 5-foliate, glabrous, coriaceous; leaflets entire, petioled, obovate-cuneate, up to 15 c.m. long, 8 c.m. wide. Cymes axillary, peduncled. Fruit 2 c.m. long, more or less edible. Abundant from the Zambesi northward.
- V. mossambicensis**, Gürke. A shrub or tree with long-petioled 5-foliate leaves with petiolate ovate-acuminate entire membranous leaflets 4-6 c.m. long, bearded in the axils of the veins beneath. Cymes lax, axillary, peduncled. Mozambique. *Carvalho*.
- V. amboniensis**, Gürke. A shrub with pubescent branchlets and 5-foliate petiolate leaves, the leaflets oblong-lanceolate, entire, glabrous above, pubescent below, 5-8 c.m. long, with long petioles. Cymes axillary. Fruit 2.5 c.m. long. Zambesia.
- V. zambesica**, Baker. A large tree with pubescent branches and thin 3-foliate leaves, densely white-tomentose below, thinly pubescent above; leaflets obovate cuneate, sessile, entire, up to 10-12 c.m. long, 5-6 c.m. wide. Cymes axillary, many-flowered, pubescent. Drupe edible, 2.5-3 c.m. long, oblong. Zambesia and Shire.
- V. Kirkii**, Baker. Shrub or small tree with pubescent branches, and shortly-petioled 3-foliate leaves, glabrous above, pubescent below; leaflets oblong, shortly petioled, entire, up to 4 c.m. long. Cymes lax, axillary; corolla pink, 1.5 c.m. long, 2-lipped. Drupe globose, 6 m.m. diameter. Zambesia.
- V. Petersiana**, Klot. Shrub with grey pubescent branches and 3-foliate leaves; leaflets small, ovate, inciso-crenate, green above, pale below. Cymes axillary, grey pubescent. Lower Zambesia.
- V. tettensis**, Klot. Answers nearly same description as *V. Petersiana*, but leaflets serrate, 2-2.5 c.m. long, glabrous above, pubescent on the nerves below; pubescence on branches brown.
- V. dentata**, Klot. 3-foliate, the leaflets ovate, 5-6 c.m. long, petioled, green above, pale below, glabrous except for hairs on the veins below; and having a few large teeth; cymes axillary. Drupe obovoid, small. Zambesia.
- V. negundo**, Linn. A large shrub with terminal paniculate inflorescence, white tomentose branchlets and panicle, numerous globose yellow fruits 6 m.m. diameter, 5-foliate long-petiolate leaves, with petiolate oblong-lanceolate entire leaflets 7-10 c.m. long, 2-3 c.m. wide; pubescent or glabrescent above, densely whitish pubescent below. Inhambane (Sim 5424) and German East Africa.
- V. thyrsoflora**, Baker. A tree with terminal paniculate somewhat pubescent inflorescence; numerous globose yellow fruits 6 m.m. diameter; 5-foliate long-petiolate leaves, with long-petiolate obovate-lanceolate thin leaflets 12-18 c.m. long, glabrous above, glandular below. Mocubella Magenja da Costa; Sim 6046. Also found in West Africa.
200. **AVICENNIA**. Evergreen shrubs or small trees, growing within tidal lagoons in all warmer regions of the world, and having opposite simple leaves, sub-terminal axillary few-flowered inflorescence, and coriaceous 1-seeded compressed fruits 2-3 c.m. diameter and length. Calyx 5-fid, not accrescent. Corolla-tube short, limb usually 4-lobed. Stamens 4; ovary imperfectly 4-celled; cells 1-ovuled. Fruit coriaceous, usually 1-seeded, obliquely ovate; seed without a skin; cotyledons large, green, conduplicate, with an erect embryo and no albumen.
- A. officinalis**, Linn. *Fern. names*—1, White Mangrove; 2, Salgiero; 4, Tobose; Tobucho; Chobougi, Cuancua or Cuacuan; 10, M'Candella; Imvetu or Mavete; Imbeda; 11, Moosa. (Perhaps Mavete is generic term for Mangroves.) Tree up to 7 metres high, usually much branched and with smooth white bark. Leaves opposite, leathery, ovate or oblong-lanceolate, 5-12 c.m. long, 2-5 c.m. wide, acute, entire, glabrous and shining above, minutely canescent and distinctly grey below, and tapering to a short flattened or furrowed petiole, the opposite petioles meeting. Calyx 5-parted, the lobes equal. Corolla-tube short; limb 4-fid, glabrous inside, the back lobe broader and shorter. Stamens 4, shortly exserted. Ovary sessile, ovate, without evident style, 2-celled, with ovules 2 in each cell, pendulous, (or imperfectly 4-celled with 1 ovule in each cell). Cotyledons folded in the same direction, one within the other, with the germ behind the inner and enclosed in the outer. Differs from *A. nitida*, Jacq. (*A. africana*, Beauv.), in having the corolla glabrous inside. Very abundant on every tidal mud-flat in the Province,

extending well inland, but not away from where brack water occasionally covers the roots. Being of comparatively little use itself, in many places it occupies sites which might be beneficially occupied with the much more valuable Red Mangrove. Occurs also in Natal and Cape Colony, and in almost all tropical lagoons.

PLATE LXXXIII. 1, Fruiting branch; 2, Section of fruit; 3, Newly germinated plantlet; 4, Seedling, with cotyledons still attached; 5, Tree, general aspect (reduced).

#### SERIES IV.—INCOMPLETÆ.

Calyx and corolla not both present, and in some cases both absent. Ovules in closed ovaries.

### INCOMPLETÆ. GROUP I. Ovary 1-celled, 1-seeded.

#### FAMILY LI.—LAURINEÆ.

Inflorescence axillary, in short panicles or racemes. Flowers bisexual or unisexual, inconspicuous; the perianth usually 6-fid, in 2 rows; stamens 9 in the male flower, opening by 2-4 lid-like valves lifting upward, modified into 6 staminodia in the female flower; ovary superior, 1-celled, with 1 pendulous ovule; style short, with peltate stigma; fruit more or less surrounded by the calyx; seed exalbuminous. Leaves simple, alternate, entire, exstipulate. The Cinnamon tree, the Camphor tree, the Bay Laurel, the Avocado Pear and the Black Stinkwood belong to this Family. A large tropical and sub-tropical Family, poorly represented here.

201. **CRYPTOCARYA**. Flowers bisexual, small, paniced. Perianth urceolate with a narrow throat, 6-fid, the lobes at last deciduous, and the tube enlarging round the ovary and completely enclosing the fruit. Stamens 9 in 2 rows, the outer 6 with introrse dehiscence, the inner 3 extrorse, with a gland at the base at each side, and alternating with 3 staminodia. Style filiform; ovary enclosed in the perianth.

**C. acuminata**, Schinz. *Vern. names*—13, Tunga; 15, Nigrafsu, and Nynkulabsu. A small tree 4-7 metres high and 15-20 c.m. diameter, having hard, close-grained, brown timber. Leaves alternate, exstipulate, coriaceous, entire, ovate-acuminate, 2.5-5 c.m. long, 2.3 c.m. wide, glabrous, shining above. Fruit 1-2 c.m. diameter, dark brown. Frequent in the Lebombo kloofs; not seen elsewhere in the Province. For illustration, see "Forest Flora of Cape Colony."

PLATE CXXIII. fig. 2.

#### FAMILY LII.—PROTEACEÆ.

Trees and shrubs, with exstipulate, simple, entire or divided, rigid, coriaceous, alternate, sub-opposite or whorled leaves, often imbricating or crowded, and usually twisted off the horizontal plane; inflorescence usually capitate and terminal, but in some kinds spiked or racemose. Flowers hermaphrodite or unisexual, branches often umbellate. Perianth regular or irregular, valvate in bud, 4-merous, but often not evidently so, the segments being variously connate, or appearing as 2 segments; stamens 4, opposite and attached to the upper part of the perianth segments, either regular, or 3 together and 1 separate or partially barren; anthers 2-celled, splitting. Ovary superior, 1-celled; style simple; fruit (in local genera) a 1-seeded nut. Seeds exalbuminous; embryo straight; radicle inferior. A large and very natural South African and Australian Family, poorly represented in the Tropics, and, so far as I know, by only 3 species in this Province.

202. **PROTEA**. Shrublets, shrubs or small trees up to about 5 metres in height, having more or less whorled branches, undivided, entire, leathery, alternate leaves; and hermaphrodite flowers capitate in large many-flowered heads, involucred by numerous coriaceous and sometimes coloured bracts, the whole head having the general appearance of a large flower-head belonging to the Family *Compositae*. Perianth long and slender, with one free segment bearing 1 anther in a slit on its face, and the other 3 segments quite connate, bearing 3 anthers in 1 slit on its face; the segments seldom straight, usually much twisted in the slender middle portion. Style long, subulate, rigid, persistent on the nut which is coated with bristly hairs. About 60 species are described, mostly from Cape Colony, others are still undescribed, among which, probably are the 2 species which occur in poor wet sandy flats in Magenja da Costa. One of these, known as (10) *Atere* grows in several places between Arenga and Bajon, while the other grows on drier ground near Mnjeba. Neither are of timber size or used for any purpose. For illustrations of various Proteae, see "Forest Flora of Cape Colony," Plates CXXV., CXXVI., CXXVII., CXXVIII.

203. **FAUREA**. Trees or shrubs, having scattered alternate leathery simple exstipulate leaves and many-flowered spikes of irregular hermaphrodite flowers, without involucre. Perianth cylindrical in bud, after it bursts having 1 segment almost free, and the other 3 connate, all deciduous, and each segment bearing an anther on its face.



Hypogynous scales 4, free, erect, acute. Style as long as the perianth, subulate, persistent, at first enclosed and arching, afterwards free; ovary densely silky; nut set with long straight hairs, making the fruiting spike a cylinder of hairs from which the stigmas protrude.

- F. arborea**, Sim ("Forest Flora of Cape Colony," 297, Plate CXXX.) A fine straight evergreen tree, 20 metres in height, up to 80 c.m. stem diameter, having widely lanceolate, somewhat wavy, entire, coriaceous, acute leaves, 7-15 c.m. long, 1.5-2.5 c.m. wide, shining above, lighter and veined beneath, tapering to both ends, and with a slender petiole 2-3 c.m. long. Spike without involucre, 10-15 c.m. long, many-flowered, the flowers spirally arranged in many rows round the stem. Flowers sessile; perianth 2-4 c.m. long, cylindrical in bud, afterwards reflexed from about the middle, leaving the subulate stigma exerted; each flower subtended by a short triangular scale, and having 4 acute hypogynous scales. Nut shortly stalked, set with dense rigid white hairs, and tipped by the long glabrous style. Seen only at Umbelusi (extra-tropical), and in Natal and Pondoland.

#### FAMILY LIIL.—URTICACEÆ.

Large trees, shrubs or herbs, with unisexual or polygamous or rarely bisexual flowers, axillary in cymes or singly, or enclosed in fleshy figs. Perianth regular or irregular, inferior; stamens hypogynous, usually as many as the perianth segments and opposite them, often inflexed in bud; anthers 2-celled; ovary superior, 1-celled, 1-ovuled, with 1-2 styles. Ovule erect or pendulous, albumen fleshy or none, radicle superior. Fruit various. A large Family, widely distributed, but most largely represented in the tropics. In the herhaceous genera stinging hairs are often present on the leaves. The ligneous kinds belong to the sub-orders Celtideæ and Moreæ.

204. **CHÆTACHME**. Small South African, spine-bearing, moncecious trees with axillary flowers; the male clustered, the female solitary. Male—Perianth 5-fid, the segments valvate in aestivation; stamens 5, in front of the perianth segments, cordate-acute, with short filaments; ovary rudimentary. Female—Perianth small, 5-fid; stamens absent, ovary ovate, pointed, with 2 long spreading, feathery styles. Ovule pendulous. Drupe 1.5 c.m. diameter, fleshy at first, afterwards dry and hard, with a bony stone. Leaves alternate, ovate, abruptly bristle-pointed, coriaceous, glabrous, reticulated on the under surface, and with a short petiole, which, like the twigs and stipules, is pubescent when young. Stipule single, opposite the leaf, embracing the further growth, and early deciduous. Spines axillary, single or in pairs, 5-25 m.m. long, acute, strong, present or absent.

- C. aristata**, Planch. *Vern. names*—13, Um-kovoti; 15, Bambangwe. A small tree or large spreading bush, up to 7 metres high, and 30 c.m. stem diameter, frequent in the Maputa Lebombo kloofs, as also in Natal and eastern Cape Colony, and having a hard close-grained timber, seldom used. Variable even on the same hush in regard to spinescence, leaf-form, pubescence, and as to whether the leaves be entire or sharply dentate. Leaves ovate to ovate-lanceolate, 2.5 c.m. long, 2-3 c.m. wide, with a bristle 5 m.m. long at the point. Male flowers minute, female flowers larger; fruit 1.5-2 c.m. diameter, globose, black, 1-seeded. For illustration see "Forest Flora of Cape Colony," 305, Plate CLX. fig. 1.

205. **TREMA**. Tropical and sub-tropical trees, having evergreen, simple, alternate, distichous, serrate leaves, and polygamous 3-morphous flowers in axillary cymes, the female on separate twigs, the male and hermaphrodite often together. Perianth-segments 5, valvate in bud, disc somewhat hairy. Male flowers—stamens usually 5, 2-celled, on short filaments; ovary more or less rudimentary. Hermaphrodite flowers—as in the male flowers, but ovary complete and potent. Fertile flowers—segments flat, unequal, imbricate below, with or without stamens, persistent; ovary sessile, style central, variously divided into 2 linear papillose branches. Ovule pendulous. Fruit small, sub-globose, often crowned by the more or less persistent style, leathery, surrounded by the persistent perianth, and with a hard stone. Albumen fleshy or scanty, embryo curved. Leaves shortly petioled, 3-veined at the base; stipules lateral, free, caducous. About 30 species, widely dispersed, and very variable in every character, of which several are African.

- T. bracteolata**, Blume. (= *Sponia bracteolata*, Hochst.) *Vern. names*—4, Peshwa; Tamawaat; Jafilo; 5, Filo; 6, Fuleti; Um-fulete; 10, Impevu; Imveyo; 13, Umbengele; Nbantini; Umvangazi. A large tree, up to 20 metres height, and 1 metre diameter of stem, but much more frequently seen or recognised as a vigorous sapling, flowering in its 2nd or 3rd year, and having abundant large distichous leaves and large cymes. Leaves 5-10 c.m. long, 2.5 c.m. wide, ovate-acute or ovate lanceolate, from a tapering, rounded or cordate, and sometimes oblique base, silky or rufous pubescent when young, scabrid with age. Cymes 2.5 c.m. long on young trees, 1-2 c.m. long or less on old trees. Fruit small, black. Abundant throughout the Province, as also in Natal and Eastern Cape Colony.

206. **CELTIS**. Trees, large trees or shrubs, mostly deciduous, with alternate, 3-nerved, simple, often oblique, serrate leaves; free deciduous stipules, axillary inflorescence, and polygamous dimorphous flowers, either male or hermaphrodite. Flowers axillary, solitary or clustered or in small cymes, with scarious deciduous bracts at the axil; 4-5 merous; the perianth-segments scarious, greenish, white or pinkish; the stamens nearly as large, present in all flowers, with short filaments; the ovary sessile, and either perfect or variously reduced, down to a tuft of bristles. Stigmas 2, fleshy-papillose, deciduous; ovule pendulous; drupe small, ovoid, longer stalked than the flowers, somewhat fleshy, with a hard stone. Perianth not present with the fruit. Widely distributed through tropical and sub-tropical regions; exceedingly variable under local conditions, consequently described in many and overlapping species. The local species have no spines.

**C. Kraussiana**, Bernh. *Vern. names*—4, 6, 13, 15, Umvumvu; 10, Namele. An exceedingly variable deciduous tree with watery sap. Leaves varying from 2-10 c.m. long, usually rounded or tapering at the base, 3-nerved, strongly serrate somewhat acuminate, often more or less oblique at the base, and with alternate but not regularly distichous arrangement. Flowers usually on 1-flowered peduncles in clusters, or in small caducous-bracted cymes. Male flowers almost sessile; female on peduncles 1 c.m. long, lengthening to 2.5 c.m. when in fruit. Flowers usually 4-merous; all the flowers have stamens, but few have perfect pistils. Perianth cut to the base, the segments concave, obtuse, ciliated; 2 are compressed, keeled, and strongly imbricating the others in bud. Stamens very large, sub-exserted, placed in front of the perianth segments on the margin of a tomentose disc; those of the female flowers sometimes on very short filaments. Ovary ovate-pointed, densely pilose, with 2 spreading rather fleshy hairy papillose deciduous stigmas, stigmatose on the inner surface; imperfect pistils variously reduced. Drupe 5-8 c.m. diameter, ovoid, yellow or red when ripe, destitute of perianth. Stipules 5 m.m. long, free, membranous, obtuse, caducous, and, like the twigs and young parts, usually silky pubescent. It occurs from the Cape Peninsula to Abyssinia, and is present but scarce, throughout the Province. A fine tree was seen in flower at Malaissa, between Inharreme and Kumbana.

PLATE XCVI. C. 1, Leaf-branch; 2, Fertile flower,  $\times 5$ ; 3, Male flower,  $\times 5$ ; 4, Fruit.

**C. (?) lactea**. (New species.)<sup>1</sup> *Vern. name*—6, Indulu. A tree 10-15 metres high and with stem 60 c.m. diameter, the bark containing thin milky juice which flows freely. Leaves alternate, stipulate, petiolate, ovate or elliptical-acuminate, rounded or tapering a little at the base, distinctly 3-nerved from the base, 10-15 c.m. long, 4-6 c.m. wide, glabrous on both surfaces, crenate-serrate, and of firm texture. Stipules caducous, 1-2 c.m. long, lanceolate. Flower and fruit not seen. This tree corresponds closely in leaf formation with *Celtis* and *Trema*, but is 3-veined and has milky juice. It is placed in *Celtis* provisionally owing to the general resemblance, but will probably prove to be a *Ficus* though very unlike that genus. Frequent in M'Chopes. A fine tree overhangs the gaol entrance at Quisico. Sim 5299.

PLATE XCVI. B. 1, Leaf; 2, Point of branch, showing stipules.

207. **MILICIA**. (New genus.)<sup>2</sup> Dioecious. Female inflorescence a congested spike, globose or cylindrical, many-flowered, each flower with 4 inferior free perianth-segments and a 1-ovuled carpel crowned by 1 long linear style, and with or without another abortive style. Male inflorescence not seen in good order in *M. africana* and not seen in *M. spinosa*. A large tree and a scandent shrub, with thin milky juice; simple, alternate, petiolate leaves, stipulate in *M. africana*. Named after Senhor Milicia, Administratador of Magenja da Costa, through whose kind assistance I was enabled to make a close inspection of the huge forest of which his district consists.

**M. africana**. (New species)<sup>3</sup> *Vern. names*—6, Intuli or i-thule; 10, Magundo. The largest indigenous tree in the forests north of the Limpopo (tropical and extra tropical), with fine clean whitish stems 60-180 c.m. in diameter and 20-40 metres high. Branches unarmed, sap milky. Leaves 12-20 c.m. long, 7-12 c.m. wide, leathery, elliptical from a cordate base, bluntly pointed, softly pubescent on the under surface and with pinnate venation. Petiole 2.5-5 c.m. long; stipules 2 c.m. long on active shoots, very short on others, caducous. Fertile inflorescence 4-6 c.m. long, 1 c.m. diameter, undivided and resembling a mulberry, the 4 perianth-segments clavate, pubescent outwardly and ultimately somewhat succulent. Ovary superior, sessile, 1-ovuled, crowned by a tuft of hairs (an abortive style?) and a long

<sup>1</sup> *Celtis (?) lactea*. (Sp. nov.) Arbor 10-15 m. alta, cauli 60 c.m. diam., e cortice succo lacteo tenui copioso effluente; foliis alternis, petiolatis, ovatis vel elliptico-acuminatis, 3-nerviis, 10-15 c.m. longis, 4-6 c.m. latis, glabris, crenato-serratis, firmis; stipulis caducis, 1-2 c.m. longis, lanceolatis; floribus et fructibus haud visis. Frequens in M'Chopes. Sim 5299. Tab. XCVI. B.

<sup>2</sup> *MILICIA*. (Gen. nov.) Dioica; inflorescentiae femineae floribus multis confertis in spica globosa vel cylindrica dispositis; perianthii segmentis 4 liberis, hypogynis; pistilli stylo longo lineari apicali, nonnunquam praeterea stylo abortivo; ovulo unico. Arbor grandis et frutex scandens; succo lactescente fluido; foliis indivisis, alternis, petiolatis.

<sup>3</sup> *Milicia africana*. (Sp. nov.) Arbor grandis, 20-40 m. alta; cauli mundo albescente, 60-180 c.m. diam.; foliis coriaceis, elliptico-cordatis, subacutis, pagina inferiore pubescentia molli oblecta, venis pinnatis; petiolo 2.5-5 c.m. longo; stipulis caducis brevibus, vel surculorum 2 c.m. longis; inflorescentia feminea 4-6 c.m. longa, 1 c.m. lata, moro simili; perianthii segmentis clavatis, extus pubescentibus, postremo subcarnosis; staminibus nullis; ovario libero, ovulo unico. Inharreme (extra-trop.); frequentior in silvis per Magenja da Costa et Nhamacurra. Sim 5386. Tab. LXXII.



linear style. Stamens absent. Male inflorescence not seen in good condition, but what were found were once-forked, each part being 8 c.m. long, and linear. The timber is valuable for cutting up and is durable, and the trunks are so much used as dug-out boats of the largest size that these are spoken of by the same name as the tree, viz., Magundo. Found at Inharreme (extra-tropical) and more frequently throughout the forests of Magenja da Costa and Nhamacurra. Sim 5386.

PLATE LXXII. 1, Leaf-branch; 2, Fertile inflorescence; 3, Tree, general aspect; 4, Stipule; 5, Male inflorescence; 6, Flower,  $\times 10$ ; 7, Same, opened out; 8, Pistil,  $\times 40$ .

**M. spinosa.** (New species.)<sup>1</sup> Vern. names—4, Pambula; 6, 7, Mbulu. A large scandent shrub, sometimes forming a bush, sometimes overtopping large trees and forming a considerable stem. Side branches mostly aborted into stout leaf-bearing spines 2-8 c.m. long. Leaves alternate, elliptical, pointed 4-8 c.m. long, 2.5-4 c.m. wide; petioles slender 1-1.5 c.m. long; fertile inflorescence sub-globose, sessile, axillary, 2-3 c.m. diameter, many-flowered; it exudes latex when cut, and is said to be finally red and edible. Flowers sessile; perianth of 4 succulent, compressed flat-topped segments; stigma subulate 1.5-2 c.m. long; seed erect, hard, exaluminous. Male inflorescence not seen. Abundant near Lourenço Marques, present but less plentiful throughout the Province. This has a considerable general resemblance to the Osage Orange (*Macluria aurantiaca*). Sim 6143.

PLATE LXXIV. B. 1, Fruiting branch; 2, Flower,  $\times 2$ ; 3, Seed,  $\times 5$ .

208. **FICUS.** A large and very natural genus, including trees, shrubs and sub-shrubs, having in common the arrangement of the numerous flowers within a common axillary receptacle, popularly known as a fig, and also the presence of milky juice, sometimes yielding rubber. Flowers minute, dioecious or monoecious, in the latter case both sexes within 1 fig. Perianth thinly membranous, irregularly 3-5 fid. Stamens 3 in the male flower. In female flower, ovary 1-celled, ovule pendulous, style lateral. Seeds small, hard, included in the receptacle, which softens when ripe and becomes the fig, edible in some species. A large number of well-known trees belong to this genus, including the Banyan (*F. indica*), the India-rubber tree (*F. elastica*) and the common fig (*F. carica*). Owing to the absence or scattered nature of the literature in this genus, and the advantage of having a complete set of the species of even this one Province, I have been compelled here, more than in regard to any other genus, to figure and describe under new names species which possibly are described already in works inaccessible to me meantime, or in which the descriptions are too meagre for identification. The variation in every character within almost every species render herbarium work practically useless here; it is only by personal knowledge of each species and its range of characters that the limitation of species can be satisfactorily done, and my belief is that the list of names already in use—mostly for single dried specimens—contains an enormous number of duplicates. While I believe that every species here enumerated is a good species, and that every species seen by me in the Province is included here, I find them more easily distinguishable in the forest than in the herbarium, and that an exact synopsis, even of the groups, cannot be satisfactory. The only tree seen, not included here, which may be a *Ficus* is that described as *Celtis* (?) *lactea*.

**F. natalensis**, Hochst. Vern. names—4-8, 13, 15, Uluzi or Umtombe. This tree usually starts life as an epiphyte in the fork of a branch, sending down roots from any height, which eventually enclose and kill the original tree, leaving the *Ficus* standing alone, the roots then forming a buttressed trunk 1 metre or more in diameter. Leaves stalked, obovate, entire, coriaceous, glabrous, rounded above or bluntly pointed, shining on the upper surface, paler and reticulated on the lower surface, 5-8 c.m. long, 2.5-5 c.m. wide, evergreen. Figs axillary or on the old wood, solitary or several together, almost sessile, bracted at the base, nearly globose, pubescent or glabrescent, 1 c.m. diameter, many-flowered, hardly edible. Stipules 2.5-4 c.m. long, caducous, membranous, glabrous, greenish-white or pinkish. On old trees adventitious roots are produced abundantly from old wood well up the stem or branches, and hang in masses 1-2 metres long. It strikes easily, is used elsewhere as a street tree, and the bark supplies rough native cordage. Leaves occasionally opposite, on angular branches. The form most common here is *var. pedunculata*, having the figs on short peduncles. Sim 5729.

PLATE XC. A. 1, Fruiting twig; 2, Occasional form with opposite leaves; 3, Tree, general aspect, showing aerial roots.

**F. depauperata.** (New species.)<sup>2</sup> A small tree with branches and twigs numerous, slender. Leaves numerous, 2.5-4 c.m. long, 1-1.5 c.m. wide, on slender petioles 1-1.5 c.m. long. Leaves narrowly obovate or somewhat cuneate, widest near the apex, rounded or bluntly pointed, and at the base suddenly rounded, the lamina meeting on the upper surface of the petiole. Veins numerous, sub-parallel from the midrib to the margin, and with fine reticulation between. Figs 7 m.m. diameter

<sup>1</sup> *Milicia spinosa*. (Sp. nov.) Frutex magnus scandens, plerumque ramulis spinosis validis 2-8 c.m. longis foliosis armatus; foliis alternis ellipticis acutis, 4-8 c.m. longis, 2.5-4 c.m. latis; petiolo tenui 1-1.5 c.m. longo; inflorescentia feminea subglobosa, 2-3 c.m. diam., sessili, floribus multis sessilibus composita; perianthii segmentis carnosius compressis planis; stigmate subulato, 1.5-2 c.m. longo; semine erecto, duro, albumine nullo. Frequens prope Lourenço Marques; minus frequens per Provinciam. Sim 6143. Tab. LXXIV. B.

<sup>2</sup> *Ficus depauperata*. (Sp. nov.) Arbor parva glabra nisi partibus junioribus cetera punctatis; ramis et ramulis multis tenuibus; foliis multis obovato-lanceolatis vel subcuneatis, 2.5-4 c.m. longis, 1-1.5 c.m. latis, obtusis vel subacutis, venis crebris subparallelis; petiolis tenuibus, 1-1.5 c.m. longis; fructu globoso, 7 m.m. lato vel minori, abrupte acuto, bractea crenata ad apicem pedunculi 3 m.m. longi circumdato. Formae depauperatae *F. natalensis* similis, sed satis distincta. In littore arenoso, Lourenço Marques. Sim 5031. Tab. XC. B.



or less, globose, abruptly pointed, set in a crenate bract-disc on top of the 3 m.m. peduncle. Young parts at first set with waxy dots, otherwise whole tree glabrous. Stem erect, branches horizontal or pendent. Grows on sand at Katembe, Lourenço Marques, near the shore, and the general appearance is that of a depauperate form of *F. natalensis*, from which species, however, it is sufficiently distinct. Sim 5031.

PLATE XC. B. 1, Branch; 2, Fruit, natural size; 3, Same, showing bracts; 4, Tree, general habit.

**F. palustris.** (New species.)<sup>1</sup> *Vern. names*—4, Chincuan; 10, Nyonia; 15, Mhla-naja-matam. A branched shrub 3.5 metres high on river banks, or with virgate habit 1-metre high on wet flats, gregarious by means of underground stolons. Exceedingly varied in accordance with age and habitat. Leaves alternate or frequently opposite, bluntly lanceolate, rounded at each end, usually 3-8 c.m. long, with a petiole 2.7 m.m. long, but on the flats north of Quelimane sometimes 10-14 c.m. long, 3.5 c.m. wide, rounded below, bluntly pointed at the apex. Stipule ciliate on the margins and back, glabrous elsewhere. Young leaves, stems and fruits usually densely pubescent at first, afterwards glabrescent, but made so rough by the permanent hair-bases that they can be used for polishing, &c. The larger-leaved forms are almost glabrous, even when young. Fig oblong or globose, pointed with 5 m.m. peduncle somewhat bracted at the top. Present along all the rivers in the Province; also in Zululand. Sim, 5414 and 6237.

PLATE XC. C. 1, Fruiting branch; 2, Stipule; 3, Tree (reduced).

**F. magenjensis.** (New species.)<sup>2</sup> *Vern. name*—10, Mtoza. Large tree, glabrous throughout. Leaves numerous, firm, varying from ovate-lanceolate to oblong, 7-15 c.m. long, 3.7 c.m. wide, wide and somewhat cordate at the base, often oblique, and tapering to the point or somewhat suddenly pointed. Petioles 2.5 c.m. long; stipules 1-2.5 c.m. long. Fig axillary, pedunculate, 2.5 c.m. diameter, nearly globose, glabrous. Twigs rather slender. Not common. Forests of Magenja da Costa, near Arenga. Sim 5653.

PLATE XCIII. B.

**F. cordata,** Thun. *Vern. names*—4, Mkaio; 15, Mkio. Glabrous throughout, except the youngest innovations. A much-branched tree; twigs slender; leaves ovate-lanceolate from a cordate base 8-10 c.m. long, 2.5-4 c.m. wide, bluntly pointed, and with petioles 1-2 c.m. long. Figs globose, 6 m.m. diameter, with peduncles 3-5 m.m. long. Stipules 2-3 m.m. long. Frequent along the Lebombo range. Sim 6305

PLATE XCIV. A.

**F. delagoensis.** (New species.)<sup>3</sup> *Vern. name*—4, Shinshamfaan. Leaves ovate-lanceolate, 7-15 c.m. long, 2.5-4 c.m. wide, tapering or rounded at the base, tapering to the point, glabrous and smooth on both surfaces, pale under, and with a slender glabrous petiole 2.4 c.m. long. Midrib and larger veins often red and in relief; reticulate venation very fine but inconspicuous; stipules 5-6 m.m. long, acute, glabrous. Fruits produced in clusters on raised warts on the main stem or old wood, 2-2.5 c.m. diameter, nearly globose, warted but not pubescent, on a petiole 1-2.5 c.m. long, which is minutely pubescent, as also are the 4 sepal-like bracts at its top. A spreading tree, not uncommon near Lourenço Marques; seen also in Maputa, Gaza, M'Chopes and Inhambane. (Extra tropical.) Sim 5171.

PLATE XCII. B. 1, Branch; 2, Fruits; 3, Stipule.

**F. picta.** (New species.)<sup>4</sup> *Vern. name*—4, M-tombe. Growing as a bush 2-3 metres high out of rock at Miluane and elsewhere on the Swaziland Railway, with numerous unbranched coppice shoots, but nowhere seen bearing figs or in what appeared to be mature condition. Leaves cordate-reniform, rounded or abruptly

<sup>1</sup> *Ficus palustris.* (Sp. nov.) Frutex habitu maxime inconstans, ramosus 3.5 m. altus in ripis fluviorum, vel virgatus 1 m. altus in campis humidis; partibus junioribus pubescentia densa obsitis, denique pilorum basibus scabris; caulibus gregariis et stolonibus subterraneis ortis; foliis alternis vel oppositis, lanceolatis, basi et apice rotundatis, plerumque 3-8 c.m. longis, 2-7 c.m. latis, breviter petiolatis; interdum 10-14 c.m. longis, 3-5 c.m. latis, subglabris, apice subacuto; stipulis glabris nisi marginibus dorsoque ciliatis; fructu oblongo vel globoso, apice acuto, pedunculo 5 m.m. longo, ad apicem sub-bracteato. In ripis fluviorum omnium in Provincia et in Zululand. Sim 5414 et 6237. Tab. XC. C.

<sup>2</sup> *Ficus magenjensis.* (Sp. nov.) Arbor magna glabra; ramulis nonnihil tenuibus; foliis multis, firmis, ovato-lanceolatis vel oblongis, 7-15 c.m. longis, 3-7 c.m. latis, sub-cordatis, saepe obliquis et apicem versus fastigatis vel abrupte acutis; petiolis 2.5 c.m. longis; stipulis 1-2.5 c.m. longis; fructu axillari, pedunculato, sub-globoso, glabro. Haud frequens; in silvis prope Arenga, Magenja da Costa. Sim 5653. Tab. XCIII. B.

<sup>3</sup> *Ficus delagoensis.* (Sp. nov.) Arbor; foliis ovato-lanceolatis, 7-15 c.m. longis, 2.5-4 c.m. latis, glabris, petiolo tenui, 2.4 c.m. longo, costa et venis primariis saepe rubris, prominentibus, venis minoribus inconspicuis reticulatis; stipulis 5-6 m.m. longis, acutis, glabris; fructibus fasciculatis, e verrucis caulis corticis ortis, sub-globosis, 2-2.5 c.m. diam., verrucosis, pedunculo 1-2.5 c.m. longo, et bracteis quatuor apicalibus sepalis similibus pubescentia brevissima obsitis. Lourenço Marques, Maputa, Gaza, M'Chopes et Inhambane. Sim 5171. Tab. XCII. B.

<sup>4</sup> *Ficus picta.* (Sp. nov.) Frutex 2-3 m. altus, locos saxosos incolens, soboles multos juniores pilis albis obsitis haud ramosos emittens; foliis cordato-reniformibus, obtusis vel mucronatis, integris, firmis, 7-15 c.m. longis et latis, palminerviis, marginibus incrassatis, glabris; venis interdum pubescentibus, coccineis; petiolis 7-15 c.m. longis, pilis albis obsitis; stipulis 1-5 c.m. longis; flore et fructu haud visis. Swaziland. Sim 6302. Tab. XCIV. B.

and shortly pointed, entire, firm in texture, 7-15 c.m. wide and long, with a thickened margin, and glabrous or with more or less pubescence on the veins on either or both surfaces. Veins sometimes bright scarlet, radiating from the base. Petioles 7-15 c.m. long; petioles and young wood at first pubescent with white hairs. Stipules 1.5 c.m. long. A most ornamental foliage plant, worth cultivation as such, but probably changing into a very different form with maturity. I cannot connect this with any other species here described. Sim 6302.

## PLATE XCIV. B.

**F. umbrosa.** (New species).<sup>1</sup> Vern. name—10, Totowe. Large shady tree. Stipules 1.5 c.m. long; petioles 8-12 c.m. long, slender; leaf cordate with an abrupt point 2 c.m. long, glabrous and shining dark-green above, paler below, entire, firmly herbaceous. Figs abundant, several together from warts on the old wood, almost sessile, 2.5 c.m. long and diameter, tapering somewhat to the base, dark-green, glabrous, with a somewhat reticulated surface. Florets stalked or sessile, with or without perianth bracts. A highly ornamental tree, frequent from Quelimane northward. Sim 5549.

PLATE LXXXVIII. 1, Tree, general aspect, much reduced; 2, Branch; 3, Fruits; 4, Sessile floret without bracts; 5, Stalked floret with bracts.

**F. utilis.** (New species).<sup>2</sup> Vern. names—4, Mpama; 6, Mpaam and Chailo; 13, Mpai. Leaf 15-24 c.m. long, 10-12 c.m. wide, elliptic from a somewhat heart-shaped base, bluntly pointed, leathery, and with a 5-10 c.m. stout petiole. Fruits pubescent, almost or quite sessile, produced singly, or several together on undeveloped branchlets, nearly globose, 2 c.m. diameter. Stipule from bud membranaceous, 10-15 c.m. long, 3-5 c.m. wide, blunt, yellowish, and spotted brown all over. Tree flat-topped or rounded, single-stemmed by nature, but often cultivated to the extent of being cut off at the ground so as to produce 4-6 clean young coppice branches without knots and of rapid growth, from which to obtain liber, which, after preparation, is used as cloth. This is the source of all the native cloth in the M'Chopes district. The tree grows throughout the Province, usually on dry light sandy soil; it occurs also in Natal and Zululand, but the manufacture of cloth from it is confined to M'Chopes, and these cloths are carried to neighbouring districts and sold, where the tree itself is abundant but only used for rough cordage or for caoutchouc. This latter product is yielded abundantly, but is of low quality and value. The preference of M'Chopes cloth I can only account for by the local knowledge of the art of coppicing, and the suitable stems produced thereby. Sim 6125.

PLATE XCI. 1, Leaf, medium size; 2, Fruits; 3, Section of fruits; 4, Stipule, from bud; 5, Tree, general aspect; 6, Tree, as grown by coppices for cloth production.

**F. zuvalensis.** (New species).<sup>3</sup> Vern. names—4, Pama; 6, Chailo. Large tree, very similar in general appearance to *F. utilis*, but differing in having shorter and more distinctly cordate leaves 10-15 c.m. long, 10 c.m. wide, velvety pubescent on the petiole and under surface, as also are the young branches, figs and bracts. Stipules glabrous, 2.5 c.m. long, pointed; petioles 5 c.m. long, stout. Fruit axillary 2-2.5 c.m. diameter, sessile, pointed. Leaves of firm, leathery consistence, shining above. Districts of Zuvala, Quisico, and Inhambane; also occasionally in Gaza and Lourenço Marques. Usually found near water. Sim 5515.

## PLATE XCIII. A.

**F. Howardiana.** (New species).<sup>4</sup> Vern. name—4 Shinshamfaan, which also is applied to *F. delagoensis*. Leaves 5-10 c.m. long, 4-6 c.m. wide, elliptical from a cordate base, round or blunt at the apex, the lamina meeting on the upper surface of the 2-3 c.m. stout petiole; under surface of leaf closely reticulated, the larger veins in strong relief, the under surface as well as the petiole, stem and figs densely pubescent. Stipules 1-2.5 c.m. long, membranaceous, caducous, pubescent on the back or glabrescent. Figs 2 c.m. diameter or less, globose, sessile or nearly so, the mouth slightly depressed, inconspicuous. Tree to 10 metres height, not

<sup>1</sup> *Ficus umbrosa*. (Sp. nov.) Arbor grandis umbrosa; foliis cordatis, in ensidem 2 c.m. longis productis, glabris, integris, fructis, pagina superiore atro-viridi, inferiore pallidioris; fructibus crebris, fasciculatis, e verrucis caulis corticis ortis, subsessilibus, 2.5 c.m. longis et latis, infra nonnihil coarctatis, atroviridibus, glabris, nonnihil reticulato-venosis; floribus pedunculatis vel sessilibus. Frequens e Quelimane septentrionem versus. Sim 5549. Tab. LXXXVIII.

<sup>2</sup> *Ficus utilis*. (Sp. nov.) Arbor grandis; foliis elliptico-cordatis, 15-24 c.m. longis, 10-12 c.m. latis, obtusis, coriaceis; petiolo crasso, 5-10 c.m. longo; stipulis (immaturis) membranaceis 10-15 c.m. longis, 3-5 c.m. latis, obtusis, flavidis, maculis brunneis notatis; fructibus solitariis vel confertis, fere globosis, 2 c.m. diam., pubescentibus. In locis arenosis per Provinciam, Natal et Zululand. Sim 6125. Tab. XCI.

<sup>3</sup> *Ficus zuvalensis*. (Sp. nov.) Arbor grandis, *F. utili* similis, nisi foliis brevioribus et magis cordatis, 10-15 c.m. longis, 10 c.m. latis, pagina superiore nitida, pagina inferiore, petiolo 5 c.m. longo, ramulis junioribus, bracteis et fructibus pubescentia velutina obsitis; stipulis glabris, acutis, 2.5 c.m. longis; fructibus axillaribus, sessilibus, acutis, 2-2.5 c.m. diam. Zuvala, Quisico, Inhambane; rarius in Gaza et Lourenço Marques. Sim 5515. Tab. XCIII. A.

<sup>4</sup> *Ficus Howardiana*. (Sp. nov.) Arbor, 10 m. altus; cauli 60 c.m. diam.; foliis cordato-ellipticis, 5-10 c.m. longis, 4-6 c.m. latis, obtusis, laminae basi brevissime subpeltata; pagina inferiore crebre reticulato-venosa, venis primariis prominentibus; pagina inferiore, petiolo crasso 2-3 c.m. longo, fructibus et cauli pubescentia densa tectis; stipulis membranaceis, 1-2.5 c.m. longis caducis, pubescentibus vel subglabris. Rueben Point, Polana et in aliis locis per Lourenço Marques et Maputa. Sunt duas varietates—(A.) normalis, folii pagina superiore primo dense pubescente, postea glabrescente. (B.) glabra, folii junioris pagina superiore glabra, atro-viridi, nitida. Sim 6262. Tab. XCII. A.

branching widely; stem up to 60 c.m. diameter. Rueben Point, Polana, and elsewhere about Lourenzo Marques and in Maputa District. There are 2 varieties, viz. :—

(A.) *normalis*. Upper surface of leaf at first densely pubescent, afterwards glabrescent.

(B.) *glabra*. Upper surface of leaf when young glabrous, dark-green, shining; named after Mr. Howard, Government Entomologist, who has made a study of the insect parasites of this and allied species. Sim 6262.

PLATE XCII. A. 1, Leaf-branch, young; 2, Fruits; 3, Section of a fruit; 4, Tree, general habit (much reduced).

**F. obovata.** (New species.)<sup>1</sup> *Vern. name*—10, i-lisha. Leaves 10-18 c.m. long, 10-12 c.m. wide, firm in texture, obovate, tapering to the base, and with a short conical point from a rounded apex; upper surface set with short stout hairs or the hard permanent bases of these; under surface closely reticulated and finely pubescent on every vein and veinlet. The young wood and 1·5 c.m. petioles also bristly pubescent. Stipules 1 c.m. long, finely pubescent. Fig not seen. Tree 10-15 metres high. Sim 6018. Forests near Maquebella, Magenja da Costa.

PLATE XCIV. C.

**F. montana.** (New species.)<sup>2</sup> *Vern. name*—15, Shlampf. Small tree, densely bristly-hairy on all young parts; glabrescent with age. Leaves 5-10 c.m. long, 3-6 c.m. wide, obovate from a somewhat cordate base, rounded at the apex, and with a 1-2 c.m. bristly petiole, the veins underneath also retaining their hairs more or less. Figs numerous, axillary on young wood, globose, pubescent, 1 c.m. diameter. Stipules 1-2·5 c.m. long, bristly outside, glabrous on the inner surface. Abundant on the dry rocky slopes of the Lebombo range, as a small bushy tree, not of timber size; often the last survivor on dry solid rock. Sim 6313.

PLATE XCV. A.

**F. capensis,** Thun. *Vern. names*—4 to 12, and 15, Mkuao; 13, Mkwane. A very large tree, nearly glabrous, but sometimes finely pubescent on the youngest growth. Leaves 10-20 c.m. long, ovate or somewhat cordate, with a wavy irregular margin, or several or many large blunt teeth, or crenate and bluntly pointed at the apex. Petiole 1-15 c.m. long; stipules 1-2·5 c.m. long, hairy externally. Figs produced on special partly developed branches, forming bunches 7-30 c.m. long, pendent from old wood, these branches growing on year after year, and each producing an annual crop of many fruits. Figs 2·5-3 c.m. diameter, fig-shaped, glabrous or minutely pubescent, yellow and edible when ripe, and usually containing maggots. Bark smooth and nearly white when young, dark and fissured when old. Closely allied to *F. integrifolia*. Seen at Lebombo, Lourenzo Marques, Chai-chai, Quisica, Inhambane and Magenja da Costa. Occurs also throughout South Africa. See "Forest Flora of Cape Colony," 307, Plate CXXXV. Sim 5941.

PLATE XCV. B.

**F. integrifolia.** (New species.)<sup>3</sup> *Vern. name*—4, Mkaou. Leaves 5-10 c.m. long, 3-8 c.m. wide, cordate, 3-veined at the base, with 1-3 c.m. pubescent petioles and pubescent stipules on bud. Fruit on specialised, partly developed, mostly pendent, much-branched branches, which continue to grow and bear year after year. Figs up to 2·5 c.m. long and wide on 1-2 c.m. peduncles, obovate, minutely downy at first and with rather prominent mouth. The name is given in distinction from *F. capensis*, which has usually toothed or lobed leaves, and is practically glabrous. Otherwise I find no distinction, and believe these 2 vary into one another, though very distinct in typical forms, and seldom showing intermediates even where they occur together in juxtaposition. Frequent in alluvial plains, making a very large soft-wooded tree with smooth glaucous-green bark. It occurs throughout the Province and also in Natal. Sim 6145.

PLATE LXXXIX. 1, Growing shoot; 2, Fruiting branch.

<sup>1</sup> *Ficus obovata*. (Sp. nov.) Arbor 10-15 m. alta; foliis 10-18 c.m. longis, 10-12 c.m. latis, firmis, obovatis, breviter mucronatis, pagina superiore pilis brevibus obsita vel scabra; pagina inferiore crebre reticulato-venosa, venis pubescentibus, ramis junioribus et petiolis 1·5 c.m. setoso-pubescentibus; stipulis 1 c.m. longis pubescentia tenui obsitis; fructibus haud visis. In silvis prope Maquebella, Magenja da Costa. Sim 6018. Tab. XCIV. C.

<sup>2</sup> *Ficus montana*. (Sp. nov.) Arbor parva fruticosa; partibus junioribus dense piloso-setosis, denique glabrescentibus; foliis 5-10 c.m. longis, 3-6 c.m. latis, e basi subcordata obovatis, venis paginae inferioris pilosis; stipulis 1-2·5 c.m. longis, extus setosis, intus glabris. Frequens in aridis saxosis declivitatibus Montium Lebombo. Sim 6313. Tab. XCV. A.

<sup>3</sup> *Ficus integrifolia*. (Sp. nov.) Arbor maxima; ligno molli; cortice levi glauco-viridi; foliis integris cordatis, 5-10 c.m. longis, 3-8 c.m. latis, triveniis; petiolis 1-3 c.m. longis et stipulis junioribus pubescentibus; ramis plerisque pendulis ramosissimis, perennibus, fructus saepe reddentibus; fructibus obovatis, 2·5 c.m. longis et latis, junioribus laevigine tenui tectis. *F. capensi* similis sed typica bene distincta, foliis integris, nec dentatis nec lobatis. Per Provinciam et in Natal. Sim 6145. Tab. LXXXIX.



**F. scabra.** (New species.)<sup>1</sup> *Vern. names*—10-11, Mtaho and Mutabu. A large tree, frequent in the forests throughout Magenja da Costa, Nhamacurra and Quelimane (tropical). Leaves 7-12 c.m. long, 5-10 c.m. wide, cordate acute, irregularly serrate, at first thin in texture, densely velvety-pubescent and glaucous on the under surface and pubescent on the upper surface, especially on the veins, but afterwards hard and firm in texture, rough on the upper surface, and pubescent below. Petiole 1.5 c.m. long, pubescent or hairy; young growth hairy, especially round the base of the petiole. Stipules 1-2 c.m. long, concave, firmly membranaceous, densely pubescent. Fig 2.5 c.m. diameter, nearly globose on a 1 c.m. peduncle, from old and young wood. Bark smooth, greenish. The fruit is not eaten, but the rough old leaves are used to rub up Assegais, &c. Sim 5644.

PLATE XCV. C.

**F. silicea.** (New species.)<sup>2</sup> *Vern. name*—6, Barowre. Leaves ovate-pointed, 7-10 c.m. long, 5-7 c.m. wide, irregularly and bluntly crenate, 3-veined at the base, of firm texture and set with hard points. Fruit nearly globular or somewhat flattened at stalk and apex 12-20 m.m. diameter, roughly hairy, occasionally bursting. Florets rather large, with 5-fid perianth. Stipules 2.5 c.m. long. Often a shrub 1-2 metres high, occasionally a tree 6-10 metres high. Frequent from Chai-chai to Inhambane. The leaves are used by the M'Chopes to polish assegais, assegai-handles, spoons, walking sticks, &c., and I saw a nice collection of local timber specimens at Quisico dressed with this material only. Sim 5381.

PLATE LXXXVII. 1, Leaf-branch; 2, Fruiting twig; 3, Section of fruit; 4, Fruit as it occasionally bursts; 5, Floret,  $\times 5$ ; 6, Tree and bush, showing general aspect (much reduced).

209. **ARTOCARPUS.** Large trees with alternate, simple, entire or lobed leaves, intra-petiolar stipules, and the inflorescence practically an inverted fig, the florets being closely packed outside the conical or globose receptacle, and forming together a large or huge composite fruit. Several, including the Jack fruit, are considered edible; others are timber trees.

**A. (?) africana.** (New species.)<sup>3</sup> *Vern. names*—4, Tondo; 10, Nunah; 15, Ndhlebe. A large glabrous tree with thin milky juice. Leaves alternate, 15-25 c.m. long, 5-8 c.m. wide, firm, elliptic-lanceolate from a rounded or somewhat cordate base, often slightly oblique, with midrib and lateral veins raised on the lower surface. Stipules intra-petiolar, convolute, 2 c.m. long, caducous. Fruit seen only immature, up to 4 c.m. diameter, in which condition it is a shortly stalked globose fig-like body, axillary or from old wood, bracted below, and apparently made up of minute florets, each rising from the base of a covering peltate scale, the scales unequal in their stage of development, some 6 m.m. diameter, others quite small, giving the whole a glandular appearance. I was informed however by the natives that the fruit grows to be 15 c.m. or more long, and is finally edible. Tree not uncommon along streams in Magenja da Costa (tropical) and found also in the Maputa Lebombos and in Lourenço Marques District. Sim 5999.

PLATE XXXII. 1, Leaves and young fruits; 2, Floret and peltate scale,  $\times 10$ .

## INCOMPLETÆ. GROUP II.

Ovary usually 2-3-4 celled; ovules usually 1 or 2 in each cell.

### FAMILY LIV.—EUPHORBIACEÆ.

Flowers unisexual, either monœcious or diœcious, sometimes crowded and flower-like in an involucre. Perianth very various, always inferior when present; sometimes absent altogether, sometimes the calyx and petals both present, or one of these. Male flowers—stamens 1, few, or many, free or more or less connate, 2-celled (or occasionally

<sup>1</sup> *Ficus scabra.* (Sp. nov.) Arbor grandis; cortice levi, viridulo; foliis cordatis acutis 7-12 c.m. longis, 5-10 c.m. latis, inaequaliter serratis, junioribus tenuibus, pagina inferiore glauca pubescentia densa velutina obsita, pagina superiore pubescente, vetustioribus firmis duris pagina inferiore pubescente, superiore scabra; petiolo 1.5 c.m. longo pubescente vel hirsuto; stipulis 1-2 c.m. longis, concavis membranaceis sed firmis, pubescentia densa tectis; fructibus subglobosis, 2.5 c.m. diam., pedunculo 1 c.m. longo. Frequens in silvis per Magenja da Costa, Nhamacurra et Quelimane. Sim 5644. Tab. XCV. C.

<sup>2</sup> *Ficus silicea.* (Sp. nov.) Frutex 1-2 m. altus, vel arbor 6-10 m. alta; foliis ovatis, acutis, 7-10 c.m. longis, 5-7 c.m. latis, inaequaliter crenatis, triveniis, firmis, scabris; stipulis 2.5 c.m. longis; floribus majoribus, perianthio quinquefido; fructibus subglobosis vel sphaericis, 12-20 m.m. diam., hirsuto. Frequens inter Chai-chai et Inhambane. Sim 5381. Tab. LXXXVII.

<sup>3</sup> *Artocarpus (?) africana.* (Sp. nov.) Arbor magna, glabra; succo tenui lacteo; foliis alternis, e basi rotundata vel subcordata elliptico-lanceolatis 16-25 c.m. longis, 5-8 c.m. latis, sæpe paullo obliquis, costa et venis primariis subius prominentibus; stipulis intrapetiolaribus convolutis, 2 c.m. longis, caducis; inflorescentiis (immaturis) breviter pedunculatis, globosis, axillaribus vel e cauli et ramis ortis, bracteatis e flosculis parvis factis. Magenja da Costa, Maputa Lebombos et Lourenço Marques. Sim 5999. Tab. XXXII.

4-celled); ovary rudimentary or absent. Female flower—stamens absent; ovary usually 2-3 celled; styles same number as the cells, often bifid or plumose; ovules 1 in each cell, or 2, collateral, pendulous. Fruit usually 3-coccous, but occasionally 1-6 coccous in accordance with species, generally dehiscent by each cell splitting into 2 halves, leaving a more or less pronounced central column, but occasionally indehiscent. Seeds albuminous. Habit very diverse, including trees, shrubs, climbers and herbs, the former either foliaceous—lignous or leafless—succulent, the latter annual or perennial. Juice almost always acrid, often milky. Leaves usually alternate or whorled, sometimes deciduous, often absent from the older plants of succulent species. Stipules herbaceous, spinous or absent. A very large and widely diffused family, much better represented, so far as lignous species are concerned, in Eastern Cape Colony and Natal than in this Province.

The plants included in Euphorbiaceæ are almost all dangerous to eat, the acrid poisonous principle being generally present, though there are several notable instances of food prepared from poisonous plants by special treatment, especially Cassiva bread and Tapioca, and in a few cases the fruits are edible raw. Many medicines are yielded, the best-known of which are Castor-oil, Croton-oil, and the tonic Cascarella bark, while the juice of several kinds is used in domestic treatment as caustic. The African Oak or African Teak exported for shipbuilding from West Africa is *Oldfieldia Africana*, Benth.; Boxwood is yielded by species of *Buxus*; several other Euphorbiaceous trees yield valuable timber; several yield dyes; India-rubber is prepared mainly from trees of this Family, resins used for varnishes are obtained from others, and the Emblic Myrobalans used in tanning are the fruit of a *Phyllanthus*. In horticulture, Euphorbiaceæ takes a prominent place, such genera as *Croton*, *Poinsettia*, *Euphorbia*, *Acalypha*, *Jatropha*, *Phyllanthus*, *Ricinus*, &c., being used in tropical gardens, and in warm greenhouses elsewhere, the dwarf English Box is a well-known garden edging, while *Rhahidophyllum* *Aithymaloides* is the upright and often nearly leafless hedge plant common at Lourenço Marques and known as 4, *Mashopa*; 6, *Shilumwaan*.

210. **BARRETTIA**. (New genus.)<sup>1</sup> Founded on a very large tree growing in the district of Quelimane, of which I have not seen flowers or fresh fruits, but the characters in hand indicate a new genus probably belonging to Euphorbiaceæ. Leaves alternate, large, digitate, petioled, conspicuously stipulate. Fruit leathery, indehiscent, widely oblong, 2-seeded, each seed in a rough hard bony stone, the flatter faces meeting.

**B. umbrosa**. (New species.)<sup>2</sup> *Vern. names*—10, Moraba, Togarogoma, and Muroi. Evergreen tree 20 to 30 metres high, with stem up to 1 metre diameter, forming heavy canopy; the foliage resembling that of the Horse-chestnut (*Æsculus*) in appearance, while the broken stems have the same smell as the Elder (*Sambucus*). Leaf digitate, of about 7 leaflets; petiole 22-36 c.m. long, terete, having 2 glands on the upper surface below the middle, and with deeply-toothed deciduous stipules, up to 4 c.m. long and 2 c.m. wide. Leaflets almost sessile, 12-30 c.m. long, 5-10 c.m. wide, widely lanceolate, tapering gradually from the middle both ways, and crenate from vein to vein. Primary venation pinnate but not opposite; secondary more or less parallel from vein to vein. Fruit about 2 c.m. deep, 2·5 c.m. wide, and 2 c.m. diameter. Seeds 1·5 c.m. long and wide, 1 c.m. diameter. Flowers not seen, but described by local residents as small, grey, and inconspicuous. Inflorescence not seen. Sim 6394. A grand shade tree, named after Mr. O. W. Barrett, Director of Agriculture, Province of Mozambique, who has assisted much in this endeavour to develop the forestal resources of the Province.

PLATE LXXI. Tree, general aspect (much reduced); 2, Leaf and stipules; 3, Fruit; 4, Section of fruit; 5, One seed; 6, Section of same.

211. **EXCÆCARIA**. Monœcious; the flowers in axillary or terminal spikes or racemes; 1-5 in each bract, the lower flowers on the spike pistillate, the upper staminate. Male flowers—Calyx minute; stamens 2-3; anthers ovoid, dehiscing longitudinally; filaments free or connate at the base; ovary rudimentary or absent. Female flowers—Calyx 3-4 fid; ovary 3-celled, ovules 1 in each cell; styles 3, almost free, simple. Capsule 3-celled, 3-seeded, the cells dehiscing by 2 twisting valves and leaving a central column, or in some species almost indehiscent. Seeds round, hard, albuminous. Trees or shrubs, with alternate, or sometimes congested, glabrous, stipuled leaves.

**E. reticulata**, Mull. Arg. *Vern. names*—4, Shlesha or Inhleha; 13, Um-Vuma or um-Halampunzi. A deciduous or semi-deciduous monœcious tree; leaves lanceolate or ovate-lanceolate, 5-10 c.m. long, 2·5-4 c.m. wide, pointed, minutely toothed, glabrous, tapering to the base, and having a petiole 10-12 m.m. long. Venation pinnate, not prominent. Stipules oblong-obtuse, 3 m.m. long, deciduous. Inflorescence racemose, the lower 2 or 3 bracts having solitary female flowers; the others 4-5 male flowers in each bract, all on short pedicels. Calyx 3-4 fid, cup-shaped, 2 lobes rather larger than the others. Male flower—stamens 3, free, slightly exserted; ovary absent. Female flower—stamens absent; ovary glabrous, 3-celled; styles 3, long, slightly connate at the base, undivided. Capsule 3-celled,

<sup>1</sup> **BARRETTIA**. (Gen. nov.) Arbor maxima; foliis alternis, digitatis, petiolatis, stipulatis; fructibus coriaceis, indehiscentibus, lato-oblongis; seminibus 2 endocarpiis inclusis.

<sup>2</sup> *Barrettia umbrosa*. (Sp. nov.) Arbor sempervirens, 20-30 m. alta, umbrosa; cauli 1 m. diam. foliis iis *Æsculi Hippocastani* similibus, digitatis, petiolis 22-36 c.m. longis, teretibus; stipulis deciduis dentatis, 4 c.m. longis, 2 c.m. latis; pinnis sub-sessilibus, 12-30 c.m. longis, 5-10 c.m. latis, lato-lanceolatis, crenatis; fructibus 2 c.m. longis, 2·5 c.m. latis; seminibus 1·5 c.m. longis et latis, 1 c.m. diam.; floribus haud visis. Tab. LXXI.



3-seeded (or by abortion 2-celled), fleshy, ridged, crowned by the persistent styles, indehiscent or nearly so. Bracts, calyces, and rachis pubescent. Racemes terminal on the young growth, the male portion breaking off after flowering. For illustration, see "Forest Flora of Cape Colony"; 320, Plate CXL.; or "Natal Plants," Plate 10. A soft-wooded rather small tree common near Lourenço Marques; found also in Natal and Pondoland.

**E. africana**, Mull. *Vern. names*—1, Sandalwood; 2, Sandalo; 4, Helongomaash or Shelingamaash; 10, Muconite (and ? Nesipolela); 13 and 15, Tomboti and Um-tomboti. A deciduous or semi-deciduous tree 5-10 metres high, 15-30 c.m. diameter of stem, with usually a straight clean stem, bare below and with pyramidal crown above, where there are numerous slender, woody, spreading, short ultimate twigs. Leaves leathery, widely lanceolate or oval-elliptical, 3-5 c.m. long, 1.5-2 c.m. wide, more or less acute, dentate or crenate along the margin, narrowed to the base, with a petiole 1-2 c.m. long, furnished with 2 glands on its upper surface at its junction with the leaf. Coppice leaves rather longer and more rounded; young leaves very different from what they ultimately develop into. Midrib prominent, venation translucent, reticulate. Catkins sessile, axillary, 1 to 3 together, 1 or 2 pistillate flowers at the base, the rest male flowers. Ovary 3-celled, with 3 stigmas; fruit 3-lobed, 1 c.m. wide, somewhat depressed but tipped by the styles. The bark is rough and red-brown in colour. The timber which eventually is nearly black smells strongly, and has led various owners to expect that they could export it with profit as *sandalwood*. Closely allied to *E. magenjensis*, but the leaf-form is different, evidently (though not tried by me) the wood of the latter does not have the same smell as this, for while passing through forests composed largely of *E. magenjensis* I enquired frequently for the scented timber *Muconite*, and was told by the natives that it was local and that I had several days to travel before I came to it, which proved correct as to the species. Frequent but somewhat local, usually in moist flats, common near Delagoa Bay and Umbelusi, also near the Limpopo and lakes in Gaza, and in certain forests in Magenja da Costa and Nhamacurra. Where easily accessible its export will probably prove remunerative. "Forest Flora of Cape Colony," page 319, Plate CXLIV. It occurs in Natal, Pondoland and Transkei.

PLATE C. B. 1, Leaves and inflorescence; 2, Fruit.

A tree at Machava which in its flowering leafless condition I took to be this species was named Shingunamaaf and said by the natives to be distinct.

**E. magenjensis**. (New species.)<sup>4</sup> *Vern. name*—10, Mundinar. Small tree, abundant throughout Magenja da Costa and Nhamacurra (tropical), and also present in Maputa (extra-tropical). Leaves ovate, bluntly pointed, entire, glabrous, shining above, turning red with age; 2.5-5 c.m. long, 2-3 c.m. wide; petiole slender, wiry, 1.5 c.m. long; bark reddish, warted; inflorescence terminal, on short side branches, or on special branchlets with or without leaves; the male flowers in a catkin 1 c.m. long, 1 or 2 female flowers at the base of this catkin or more frequently in 1 or more small clusters of flowers in the axils of bracts below the catkin. Ovary 3-celled, with 3 stigmas; fruit 3-lobed 10-12 m.m. diameter, 6-7 m.m. deep, tipped by the 3-fid style. Not quite deciduous, but the inflorescence mostly in the axils of shed leaves. Sim 5590.

PLATE C. A. Usual leaf-form; 2, Young leaves and inflorescence; 3, Inflorescence; 4, Fruit.

212. **EUPHORBIA**. Monœcious or dioecious; when monœcious several monandrous male flowers and 1 female flower placed together inside a calyx-like involucre, and forming a flower-like inflorescence, when dioecious 1 sex is absent but the calyx-like involucre maintained. Involucre 4-8 lobed, and often having glands between its lobes and the flowers. Glands various, if isomerous with the involucre alternate to its lobes. Male flowers many in an involucre, either independent or in fascicles of 4 or 5 in which they are placed one behind another, the inner flowering first and are past before the outer open; each flower consisting of 1 stamen, without perianth, jointed to a short pedicel, which consequently has the appearance of a jointed filament. Anther 2-celled, erect in bud, the cells roundish, flattened, separated by the connective, and opening by a longitudinal slit across the upper end. Bracts inside the involucre surrounding the male flower linear or lacerated, numerous. Pistillate flower single in the centre of the involucre (and surrounded by the staminate flowers when monœcious) consisting of a single pistil, without perianth. Ovary 3-celled, ovules solitary. Fruit 3-seeded, each cell dehiscing in 2 valves, and leaving a persistent central column. Seed albuminous. Habit very various, including herbs, shrubs and trees, sometimes ligneous, or herbaceous and foliaceous, often succulent and almost leafless, but usually having an acrid milky juice. Leaves when present usually entire and alternate, except those on the inflorescence which are often opposite. Flowers in terminal or axillary cymes on the young growth, usually green. A large genus, poorly represented here except by small herbaceous species.

**E. Tirucalli**, Linn. *Vern. names*—4, Sheshequane; Chirotwana; 6, i-donga; 10, Engosa. A bushy tree, 4-8 metres high, with stems up to 30 c.m. diameter; much branched, drooping; the younger branches cylindrical, terete, 6-10 m.m. diameter, produced few together, or in irregular whorls, or separately, terminating abruptly,

<sup>4</sup> *Excœcaria magenjensis*. (Sp. nov.) Arbor parva; cortice rubro, verrucoso; foliis ovatis, subacatis, integris, glabris, pagina superiore nitida, velustioribus rubris, 2.5-5 c.m. longis, 2-3 c.m. latis; petiolo tenui; inflorescentis apicalibus e ramis brevibus lateralibus vel ramulis ortis; floribus masculinis in amento 1 c.m. longo dispositis; floribus femineis 1 vel 2 prope basim amenti, vel saepius aggregatis in acervulis in axillis bractearum infra amenta; ovario 3-loculari, trilobo, 6-7 m.m. longo, 10-12 m.m. diam., stigmatibus 3. Frequens per Magenja da Costa, Nhamacurra et Maputa. Sim 5590. Tab. C. A.



leafless, and without spines, and carrying the inflorescence on the point. Flower heads numerous, almost sessile, on short divaricately divided 2-4-6-8 flowered peduncles, each head about 6 m.m. diameter, enclosed within 5 flat glands, and including in most heads 16-20 1-stamened male flowers, while only an occasional head has also a fertile flower consisting of a stalked 3-celled ovary surmounted by a 3-fid stigma. Common near Lourenzo Marques where it is often used as a rough hedge, growing by stump cuttings; present but not common throughout the Province. The dried latex has a small commercial value, but the tree is not sufficiently abundant anywhere here to make this an industry.

PLATE LXXXIV. 2. A. Tree, general aspect (reduced); B. Branch; C. Inflorescence,  $\times 5$ ; D. Same,  $\times 10$ ; E. Inflorescence, including one fertile flower,  $\times 5$ ; F. Fruit.

**E. grandidens**, Haw. *Vern. names*—4, Hloho, Hlonhlo; 4, 13, 15, Umhlonhlo; 6, Masongo. Tree 4-10 metres high and up to 60 c.m. diameter of stem, more or less flat on the summit, the branches stout, ascending, branched in candelabra fashion, succulent, leafless or almost so, deeply 3-4 ridged, the ridges 5 m.m. diameter, 3-4 c.m. deep, abundantly plaited, set with spines in pairs along the top of the ridge. Flowers mostly terminal on the branches. Fruit 3-celled, 3-lobed, 1.5 c.m. wide, surmounted by the 3-fid style. Possibly more species than 1 are included here as there appeared to be local differences which might or might not be specific. Frequent near Lourenzo Marques and on the Lebombo foothills; not uncommon from the Limpopo to Inhambane, and present but not common throughout Quelimane, Maganja da Costa and Nhamacurra. The milky juice is very acrid.

PLATE LXXXIV. 3. G. Tree, general aspect (reduced); H. Part of branch and fruit (natural size).

Another species—4, *Thutwa*, a spreading bush 2 metres high, has succulent stems furnished with pubescent obovate leaves 10 c.m. long, and is present occasionally throughout the Province and apparently protected by the natives, though for what reason I did not find.

213. **GELONIUM**. Dioecious. Sepals 3-5, irregular, imbricate, usually the outer 2 or 3 green, hooded and crested and enclosing 1 or 2 membranaceous and more petal-like, without crest; all glabrous or ciliate; petals none (*or otherwise sepals 2-3, petals 1-2*). Male flower—stamens about 16, extrorse; anthers 2-celled; cells parallel and united, dehiscing longitudinally; no rudimentary pistil. Female flower—stamens absent or very rudimentary; ovary 3-celled; styles 3, short, bifid; ovules 1 in each cell. Capsules 3-celled, 3-angled, 3-seeded, woody, with a leathery coat; each cell ultimately dehiscing in 2 twisted valves, and leaving a persistent central column. Tropical and sub-tropical small trees and shrubs. = *Ceratophorus*, Sond.; Harv. Gen., p. 337.

**G. africanum**, Mull. *Vern. name*—6, Shaikanzembe. A shrub or small tree 3-4 metres high, usually of erect unbranched habit, with alternate, coriaceous, obovate leaves, cuneate at the base, rounded and 5-7 crenate at the apex, almost sessile, glabrous, warty-reticulate on both surfaces, paler on the under-surface, 3-4 c.m. long, 2-3 c.m. wide, the crenations frequently emarginate. Stipules 2, deltoid, acute, 2 m.m. long, caducous, leaving a scar on the old branches. Whole plant glabrous except the disc. Flowers mostly opposite the leaves, either sessile or shortly umbellate in fascicles of 1-6; buds compressed, 2-crested from the hooded sepals. Branches terete, twigs compressed, 4-angled, very green. For illustration, see "Forest Flora of Cape Colony," Plate CIII., fig. 5. Frequent in the coast-dune scrubs at Delagoa Bay and Maputa; also in M'Chopes.

**G. adenophorum**, Mull. *Vern. name*—6, Shilumwaan. A small tree, glabrous throughout, having alternate leaves and branches, with the inflorescence opposite the leaves. Leaves 5-10 c.m. long, 3-6 c.m. wide, obovate-lanceolate, acute, somewhat cuneate at the base, minutely toothed, shortly petiolate, and glandular-warty on both surfaces. Flowers few, almost sessile, calyx-lobes dotted and ciliate; fruit 1 c.m. across. M'Chopes, near Quisica. Sim 5203.

214. **CLAOXYLON**. Dioecious trees or shrubs, with alternate, simple leaves, short axillary racemes, apetalous flowers with 3-4 sepals, the male flower with numerous stamens, the female flower without stamens, the ovary 3-celled, with 1 ovule in each cell. Capsule dehiscent, 3-lobed, each 2-valved.

**C. capense**, Baill. Shrub or small tree, with elliptic-lanceolate toothed coriaceous leaves 10 c.m. long, 2-3 c.m. wide, pointed and shortly petiolate. Racemes axillary, slender, as long as the leaves, with the flowers in occasional clusters. Lourenzo Marques and Maputa.

**C. Kirkii**, Mull. Shrub or small tree, with oblong-ovate, obovate or lanceolate, crenate-dentate, shortly petiolate acute leaves 5-8 c.m. long, 2-3 c.m. wide; flowers clustered in the axils, on slender pedicels, very small. Ravuma.

215. **BRIDELIA**. Monœcious trees or shrubs, with alternate simple stipulate leaves, and racemose, spicate or clustered axillary inflorescence, the flowers having the calyx 5-fid, valvate in aestivation; petals 5; stamens 5; ovary 2-3 celled; cells 2-ovuled; and the fruit fleshy.

**B. micrantha**, Pl. *Vern. names*—4, Hleha; 6, Inshepu; 7, 8, Saba or Insaha; 13, Um-hlahla-ma-kwaba. A small tree with shortly petiolate elliptical-acute, crenate or bluntly dentate leaves 8-12 c.m. long, 3 c.m. wide, with reticulate venation distinct on the under surface, which is more or less pale. Flowers clustered in the

axils of the leaves ; petals of the male flower 3-toothed, those of the female acute ; fruits usually solitary, 3-lobed, leathery, indehiscent. Frequent throughout the Province, as also in Natal and in forms ranging from glabrous to pubescent elsewhere in Tropical Africa.

**B. stipularis**, Bl. Bijdr. Large shrub, with pubescent twigs, elliptic or obovate, entire, petiolate leaves, 5-7 c.m. long, 3-3½ c.m. wide, obtuse or shortly pointed, rounded or cordate at the base, pubescent above, rufescent below. Bracts more or less leafy ; petals alike in the sexes. Calyx accrescent. Zambesia, Transvaal, &c.

**B. cathartica**, Bertol. f. (Illustr. Mozamb., 4, 16, n. 13, t. 6.) Glabrous shrub or tree, with elliptical or obovate leaves 3-7 c.m. long, 2-3½ c.m. wide, rounded at both ends, pale and reticulated under. Flowers clustered in the axils, petals entire, calyx not accrescent. Zambesia.

216. **ACALYPHA**. Monœcious. Flowers in axillary spikes, male above, and with the female flowers in the lower bracts ; or the male in spikes and the female solitary. Calyx 3-5 parted ; petals absent. Male flower—stamens 8-16 ; ovary absent. Female flower—stamens absent ; ovary 3-celled ; styles 3, feathery ; ovules 1 in each cell ; cells dehiscing in valves. Worthless shrubs or shrublets, of which several species are scattered through the Province, 1 of the most common being known as 4, Sicarit.

217. **ANTIDESMA**. Dioecious. Flowers in terminal or sub-terminal racemes or spikes, or sometimes in much-branched panicles. Male flower—calyx 3-5 lobed ; petals absent ; stamens 3-4, opposite the calyx-lobes ; ovary rudimentary. Fertile flower—calyx 3-5 lobed ; petals and stamens absent ; ovary 1-celled, 2-ovuled ; stigmas 2-3, each emarginate ; drupe 1-seeded, indehiscent. Leaves simple, alternate, 2-stipuled.

**A. venosum**, E. Mey. Vern. names—4, In-honge, Shonga Chonga or Songue ; 6, Ilenja ; 10, a-ouri-ouri or i-wira-wira ; Nyema-nyemba ; 13, Um-tyongi and isi-Bamuloti ; 15, Mhlala-ho-pulu. A shrub or small tree, 3-7 metres in height, with variable more or less distichous leaves, usually ovate-elliptical, rounded at the base, bluntly pointed, or acute, entire, petiolate, 7-10 c.m. long, 4-5 c.m. wide, of thin but firm texture, at first densely pubescent, ultimately glabrescent above. Twigs, stipules, petioles and inflorescence all more or less pubescent. Fruits 5 m.m. long, oblong, red, edible, hanging in spikes or racemes like red currants. Common throughout the Province, as also throughout all warmer parts of Africa. For illustration see "Forest Flora of Cape Colony," Plate CXIII. fig. 4. The inflorescence is normally a spike about 10 c.m. long, in both sexes, but I have specimens of both in which variation occurs from this to a much-branched panicle, probably through gall-agency. The much-branched panicles, which are not uncommon are seldom seed-bearers.

218. **CYCLOSTEMON**. Dioecious. Flowers axillary ; sepals 4-5, imbricate ; petals absent. Male flower—stamens few or many ; ovary rudimentary. Female flower—disc a wide ring, stamens absent ; ovary 3-celled ; stigmas short, wide. Fruit 2-3 celled ; cells 2-ovuled, 1-seeded, indehiscent tropical or sub-tropical trees.

**C. argutus**, Muhl. Vern. names—4, In-toma ; 5, Mtatasuma ; 6, Shishu-waan ; 10, Mkakara ; 13, Umhlagella. An umbrageous evergreen tree, somewhat gregarious, 15 metres high, 30 c.m. diameter of stem. Leaves alternate, ovate-lanceolate, acuminate, sometimes rounded, sometimes tapering at the base, and usually more or less oblique, pubescent or glabrescent and shining green on the upper surface, densely pubescent and pale below ; either bluntly and distantly toothed or closely serrate, 5-8 c.m. long, 2-4 c.m. wide, with a petiole up to 1 c.m. long. Flowers axillary. Male flowers either in fascicles of 8 or 10 or on short 5-6 flowered spikes, pubescent, calyx-segments ciliate ; stamens 4-12. Female flowers—1 or 2 in each axil on pedicels 1 c.m. long ; sepals 2 outer and 2 inner ; disc densely setose at first, glabrescent after flowering ; ovary globose, 2-celled, densely pubescent, stigmas 2, expanded, flat, glabrous. Fruit 2-celled, densely pubescent, of firm corky texture, 12 m.m. long, 10 m.m. wide. The leaf-form and margin are constant on each tree, but the trees vary much in these respects. Twigs slender, leafy, the young shoots starting from a scale-enclosed bud. Stipules caducous. Frequent throughout the Province, and in Natal and Pondoland ; in the latter locality the natives brew a liquor from the fruits, and also eat them raw, and the timber is there used for disselbooms, &c. For illustration see "Forest Flora of Cape Colony," 314, Plate CXLI. fig. 2.

Another tree, 10, Na-noa, not seen by me but of which native doctors at Arenga, Magenja da Costa, brought me leaves is believed to be either *C. natalensis* (Harv. Thes. Cap., Plate 200), or *Rawsonia lucida*, Harv. (see "Forest Flora of Cape Colony," Plate CXLI. fig. 2). They claimed that string from the bark tied round the ankles would keep snakes from biting one. The leaves are up to 15 c.m. long 4 c.m. wide, oblong-lanceolate and closely toothed. Sim 5859.

219. **MALLOTUS**. Trees and shrubs, monœcious or dioecious, with alternate, petiolate, stipulate, simple, usually roundish leaves, and terminal, axillary, or leaf-opposed inflorescence. Calyx 2-4 fid or parted ; corolla usually absent. Male flower—stamens 10 to many, anthers oblong, 2-celled ; ovary absent. Female flower—ovary 2-3 celled ; ovules 1 in each cell ; styles 2-3 slightly connate ; undivided. Fruit 2-3 celled or by abortion 1-celled, indehiscent.

**M. Melleri**, Mull. *Vern. name*—10, Mlola de nato. A large tree, with alternate cordate or reniform-acute leaves 10-20 c.m. wide, and hardly so long, entire or irregularly crenate at the margin, nearly glabrous above, paler and often densely stellate-pubescent below; 5-nerved from the base, the pubescent petiole 5-15 c.m. long; inflorescence terminal and axillary, cymose-paniculate, densely hairy. Described in De Cand. Prod. XV., 959, from Manganja Hills, as having about 40 stamens and no petals, but my specimens from Magenja da Costa, Sim 5560, which appear otherwise to agree with this tree, have 5 petals, and only 10 stamens, and bear considerable general resemblance to *Macaranga Capensis* ("Forest Flora of Cape Colony," Plate CXXXIX.) Female flower and fruit not seen.

220. **JATROPHA**. Monœcious. Sepals and petals both present, 5-merous; aestivation convolute; petals free, alternating with glands. Male flower—stamens 8-10, the filaments united more than half-way into a central column, the alternate filaments longer than those between them; pistil absent. Female flower—stamens absent; ovary 3-celled, styles 3, free; stigma bifid; ovules 1 in each cell, pendulous from near the top; fruit 3-seeded; cells dehiscing in 2 twisted valves. Shrubs or herbs with milky juice. Several herbaceous and shrubby species occur, but the only plant of any importance is the exotic, *J. curcas*, which was imported long ago, and now occurs as a rough hedge round native Kraals, &c., in all parts of the Province, and is more or less naturalised in many places. The natives string the seeds together on grass stems, and after a few days drying the grass burns like a candle from the oil in the seed; hence the common name 1, Candle-nut. It also bears the names—4, Shimbangana; 6, Lambu; 7, Maluku; 10, Gwandafuta and Kuramunda; 11, Nicororwa. It has 3-lobed leaves 10 c.m. long and wide, with a wide cordate base, and grows readily from cuttings. The oil is a considerable article of export in some parts of the world.

A group of about 5 species, apparently belonging to one undescribed Euphorbiaceous genus, occurs in abundance in the forests of Magenja da Costa, but the specimens obtained hardly warrant description without comparison with material in the large herbaria containing East African trees. The species have a general relationship in foliage, flower, and fruit; they form large trees, some of which are used locally for timber; they have simple, alternate, obovate or elliptical leathery leaves, 10-20 c.m. long, rather crowded towards the ends of the branches, axillary pedicellate flowers, stamens numerous, crowded on a raised central torus, 3-4 styles, each 2-4 fid, and large indehiscent "edible" fruits, usually 4-celled, sometimes 3-celled, with 1 seed in each cell. The native names overlap somewhat throughout the group, and include 10, Mtela, Untela, Moriba, Mqunabe and Muquinapo. Another Euphorbiaceous tree, named doubtfully "Enchowana," seen at Inharrime River, produced an abundant flow of latex, but gave no clue for identification. The leaves are simple, elliptical, entire; the fruit 3-celled, 3-lobed, 3-seeded, dehiscent, and about 10 c.m. diameter, surmounted by 3-fid style. The tree is of rapid growth on poor sandy soil, withstands fire well, and grows to 60 c.m. stem diameter. If the latex proves of value for rubber, its cultivation would be easy.

#### INCOMPLETÆ. GROUP III.

Perianth absent or scale-like. Flowers unisexual, usually arranged in catkins or cones. Ovules enclosed in an ovary, and seeds in a seed-vessel (Achloramydæ).

#### FAMILY LV.—MYRICACEÆ.

Flowers unisexual, monœcious or diœcious, both male and female flowers in the axils of scarious ciliated bracts, in oblong or elongated axillary catkins. Perianth absent or in some species represented by 2-4 bracteoles. Male flower—stamens 2-4; filaments short, filiform. Anthers basifixed, short, wide, 2-celled, opening by lateral slits; ovary absent. Female flowers—stamens absent; ovary globose, 1-celled, 1-ovuled, with 2 sessile long papillose arching stigmas, and usually 2-4 bracteolate. Ovule erect; fruit 1-seeded, indehiscent, globose, often warted, and usually coated with wax; ultimately dry. Leaves alternate or occasionally sub-whorled, simple, evergreen, often glandular or waxy and more or less aromatic. Shrubs or small trees, widely distributed in temperate climes, except Australia. The Family contains only 1 genus.

221. **MYRICA**. Characters same as those of the Family.

**M. æthiopica**, Linn. *Vern. name*—1, Waxberry. Monœcious, androgynous, the male flowers mostly toward the base of the catkin, the female scattered along it. Catkins about 12 m.m. long when in flower, afterwards stretching to 4 c.m. and bearing 15-30 berries each. Small male catkins are often produced at the base of the larger ones on each side. Bracts pubescent, ciliate. Stamens 4, or sometimes 2, nearly sessile. Berries 2 m.m. diameter, warted, waxy, very numerous. Leaves lanceolate, acute, 5-10 c.m. long, shortly petioled, setose, with soft white hairs when young, afterwards either hairy or glabrous, often cuneate below, and either entire or 3-toothed on each side, sometimes the teeth more numerous, more irregular, and extending to near the petiole. Leaves either alternate, sub-opposite, sub-whorled, or 2 together from the same side of 1 node. An erect branching shrub, usually 12 metres high, but seen in a swamp at the Mutambe



sugar estate 7 metres high, and 15 c.m. diameter of stem. Occurs north to the Zambesi and south to Cape Town, but is rather local in this Province, and usually in alluvial swamps. See "Forest Flora of Cape Colony," Plate CXXXVII., fig. 2.

#### FAMILY LVI.—CASUARINÆ.

Trees and shrubs, with leafless jointed cylindrical twigs having a whorl of teeth sheathing the next section at each node. Monœcious or diœcious, the male flowers in terminal spikes, the female in cones terminal on short side branches. Male flower consists of 1 stamen subtended by 2 bracts; such flowers occur in several whorles forming the spike. Female flowers without perianth, arranged in a regular cone, the long red stigmas protruding while in flower. Ovary 1-celled, with 2 collateral ovules. Seed solitary, compressed. Branches and stems composed of hard useful timber. One genus only.

222. **CASUARINA.** Characters same as those of the Family. Several species, mostly Australian, now widely dispersed in cultivation.

**C. africana.** L. *Vern. names*—10, Moeri; 11, Mchawa. A monœcious tree of erect habit, branches pointing upward, and growth widening downward. Young branches slender, 1 m.m. diameter, cylindrical, jointed at about 1-2 c.m. distance, somewhat ridged, and with about 7 teeth at each joint. Scales of the male inflorescence hairy. Mature cone woody, 2 c.m. long and wide, oblong, the cells 1-seeded; seed 5 c.m. long, brown, winged. Tree 10-15 metres high, growing in erect pyramidal form on the bare sand-dunes from Inhambane northward, and apparently enjoying the sea breezes, the stem diameter being from 40 to 60 c.m. Whether originally introduced or indigenous it is now difficult to say; it has every appearance of being indigenous, and if exotic it must have arrived long ago and found a congenial home.

PLATE LXXXV. 1, Tree, general appearance; 2, Branch; 3, Portion of same,  $\times 10$ ; 4, Scales of inflorescence,  $\times 20$ ; 5, Male inflorescence,  $\times 4$ ; 6, Stamen,  $\times 20$ ; 7, Female inflorescence in bud,  $\times 4$ ; 8, Same, in flower (red); 9, Cone; 10, Seed.

#### SERIES V.—GYMNOSPERMÆ.

Ovules naked on the cone-scales. Inflorescence usually in cones. Opinions differ as to the formation of the male inflorescence, some botanists holding that a catkin is 1 monadelphous flower with connate filaments, forming a central column from which anthers spread horizontally in definite order, others claiming that the catkin consists of a rachis around which are arranged many naked monandrous flowers. The latter view agrees most closely with the formation of the female inflorescence, which, though usually in cone form, is sometimes reduced to a single ovuliferous scale. This ovuliferous scale, whether in a cone or singly, represents an unclosed carpel, on the naked surface of which the ovule is produced; 1 such scale constitutes a flower in Podocarpus, consequently in cones where several or many such scales occur each is held to be a similar flower having only 1 open carpel and no protective organs.

#### FAMILY LVII.—CONIFERÆ.

Diœcious or monœcious. Male flowers in catkins, each catkin consisting of many scale-like unprotected almost sessile stamens, arranged singly or in opposite and decussate order round a central axis, each stamen having 2 pollen cells on its under surface, and a longer scarious connective. Female flowers—consisting of naked ovules placed singly or several together on the upper surface or axil of fleshy or woody scales, arranged either singly or in cones of 2 or more. Seeds unprotected or sheltered by cone scales. Resinous trees, branching freely, and having linear or scale-like undivided leaves with straight venation.

223. **PODOCARPUS.** Diœcious. Male catkin axillary, simple or 3-branched, sessile or shortly pedicellate; anthers many, extrorse, sessile, spirally arranged, 2-celled, with an exerted connective. Female inflorescence axillary, solitary, stalked, consisting of 1 or 2 ovule-bearing scales. Ovule solitary on each scale. Seed with a hard shell and a fleshy skin. Leaves linear or oblong-lanceolate, coriaceous, glabrous, acute, with the midrib prominent on the under surface, and often the petiole twisted. Twigs ending in a scale-covered seasonal resting bud. Catkin and female inflorescence axillary along the young shoots and produced while the shoots are quite young. The female flowers are very inconspicuous, and the expanding growth-buds are often mistaken by casual observers for flowers. Large timber trees, forming the most important item in South African forestry, but almost absent from this Province.

**P. elongata,** L. Her. *Vern. names*—1, Yellow-wood; 3, 14, Geelhout; 13, Um-koba; 15, Msongo, or Songue. Leaves evergreen, on mature trees linear or linear-lanceolate, 2-4 c.m. long, tapering shortly to the sharp point, twisted at the petiole, and often sub-opposite. Twigs whorled or scattered close to where the seasonal resting-bud has been. Leaves on seedling trees or side shoots 5-7 c.m. long, lanceolate, usually opposite or sub-opposite, and often distichous. Male catkin 6-8 m.m.

long, 3 m.m. wide, oblong, sessile, usually 3-branched. Fertile inflorescence of 1 or occasionally 2 membranous ovule-bearing scales terminal on a short many-bracted peduncle. Bracts deciduous, and the receptacle does not become succulent. Seed globose, 1 c.m. diameter with a glaucous skin and smooth bony shell. A valuable timber tree abundant in parts of Cape Colony, Natal, Transvaal, East Africa Protectorate, and Abyssinia, but which only touches the western boundary of this Province in kloofs along the Lebombo range. Seen by me only at Estatuene, but I was informed that on the Swazi side of the border it is more frequent. It consequently hardly enters the commercial forestry of this Province. For further details as to the economic value of this and other South African Podocarpi see "Forest Flora of Cape Colony," 332-335.

PLATE XCVII. A. 1, Branch of male tree; 2, Fruit; 3, Tree, general aspect (much reduced).

224. **WIDDRINGTONIA.** This genus is introduced with doubt, as I am not aware that it has been found in the Province, still as *W. Whytei*, Rendle, the Milanji Cedar, occurs on the Shire highlands adjoining if not within the Province, and *W. Mahoni*, Mast. occurs in Melssetter District, Rhodesia, I think it is almost certain to occur here also. The species form fairly large monœcious trees producing a valuable cedar class of timber, and the general appearance is like a cupressus. Male flowers few, in solitary catkins, terminal on twigs; catkins very small, subtended by 2 scales. Stamens in 4 rows; anthers 2-3 celled. Female inflorescence in cones terminal on short lateral twigs; scales usually 4, equal, decussate, spreading when young, ultimately ligneous and inflexed, enclosing the seeds. Ovules about 5 at the base of each scale on its inner surface; seeds fewer, about 4-8 per cone, narrowly winged. Branches terete; leaves scale-like, and pressed, small, opposite and decussate, sub-opposite or somewhat spiral; leaves on vigorous main branches more spreading and leafy than those on the slender twigs; the leaves on seedlings and young trees linear, spreading, arranged spirally. Cotyledons 2, linear, timber very resinous. In Cape Colony and Natal several species occur. See "Forest Flora of Cape Colony," 337, and Plate CXLVII.

#### FAMILY LVIII.—CYCADACEÆ.

Slow-growing tropical and sub-tropical palm-like trees, usually erect, unbranched, and with the leaves at the top, the stem being clothed with the petiole-bases of decayed leaves. Dioecious. Flowers in cones. Perianth absent, each flower in the male cone being a single scale having numerous 1-celled, 2-valved, sessile anthers on its lower surface. Female cone—scales larger, woody, widened at the apex and having an ovule on each side unprotected except by the peltate shield. Nuts numerous in a cone, large, with a hard woody coat. Leaves pinnate, coriaceous, circinate in veneration, the pinnæ often spine-pointed or spine-toothed. Cones in the axils of the youngest leaves, consequently crowning the stem, the male cone in local kinds 30-45 c.m. long, cylindrical, the scales firmly membranaceous; the female cones about 30 c.m. long, oval or elliptical, taking several years to mature, the scales woody and usually more or less tomentose. These trees are ornamental in cultivation, transplant easily, and are in demand for exportation to European horticultural establishments.

225. **ENCEPHALARTOS.** Characters of the Family as given above. One or several species occur in M'Chopes and elsewhere south of Inhambane. One is used in some quantity for ornamental purposes in the square at Quisico, transplanted from the neighbourhood. None were seen north of the Zambesi. *Vern. names*—6, Imhanga or Mwanga; 13, Umpanga.

### CLASS II.—MONOCOTYLEDONES.

Embryo with only 1 cotyledon. Primary root abortive and producing lateral roots which develop. Wood tissues in isolated bundles. Leaves usually having parallel venation. Flowers usually 3-merous, or some multiple of 3. Usually herbaceous, bulbous, or soft wooded plants, but a few are hard and useful timbers differing in habit and timber formation from trees belonging to Dicotyledones.

#### FAMILY LIX.—SCITAMINEÆ.

Flowers irregular, unisexual. Perianth superior, outer perianth lobes calyx-like inner petaloid.

226. **MUSA.** Calyx 3-5 lobed, petal single, perfect stamens 5; anthers 2-celled. Stems unbranched, up to 30 feet in height, formed of closely clasping leaf-stalks; the leaves foliaceous, 2 to 7 metres in length, 30-100 c.m. wide; the inflorescence terminal in spicate panicles, flowers at first enclosed, several together, in large caducous bracts; the lower part of the panicle fertile, upper part staminate. Ovary 3-celled; ovules many in each cell; fruit a banana. About 20 species, from the tropics of Africa and Asia. The Banana, *M. sapientum*, Linn. is cultivated throughout the tropics and sub-tropics for its edible fruit, and is cultivated by Europeans and natives throughout the Province of Mozambique, but is not indigenous; the fruits of the other African species are not edible; from several species of *Musa* the valuable fibre, *Manilla Hemp*, is obtained in other countries; the dried leaf of the banana is used here as a wrapper for cigarettes, especially by the natives.

*M. livingstoniana*, Kirk, having non-edible fruit, and seeds 12 m.m. diameter with a large hollow at the hilum, is recorded by Kirk from Gorongozo. Portuguese East Africa and from other localities in East Africa, but was not seen by me. 2 other species occur in neighbouring districts beyond our border. If ever *Musa fibre* comes to be an article of export the plants will have to be planted first. The allied *Strelitzia augusta*, Thun., the so-called Wild Banana of Natal, does not appear to extend into Portuguese territory.

#### FAMILY LX.—LILIACEÆ.

Flowers regular, hermaphrodite; perianth inferior, petaloid. Leaves undivided. A large Family containing many favourite garden plants.

227. **DRACÆNA**. Leaves flat, foliaceous. Stems erect, simple or branched. Inflorescence racemose or paniculate; pedicels articulated at the middle. Perianth-tube cylindrical, 6-lobed, the lobes equal. Stamens 6; Ovary 3-celled; cells with 1 ovule in each; fruit a 1-3 seeded herry. Trees or shrubs; about 50 species, mostly Tropical African, several being from German East Africa and Myassaland. Many are favourite greenhouse and decorative plants.

*D. reflexa*, Lam. *var. nitens*, Baker. *Vern. names*—5, Mtuloshedo or Ntshonga; 6, Ntshinga-mati; 10, I-vitae or Mvitae. A shrub or tree, sometimes 10-15 metres in height and up to 30 c.m. diameter, usually more or less branched. Leaves numerous, sessile and somewhat clasping, linear, firmly herbaceous, shining, 15-30 c.m. long, 1-2 c.m. wide, or on coppice shoots 12-18 inches long, 1-1½ inches wide. Veins parallel, midrib evident. Panicle 4-12 inches long, terminal; flowers 1-3 together on its undivided branches; perianth 2-3 c.m. long, narrowly cylindrical, greenish. Berry globose 2-3 c.m. diameter. Yellow, not edible, 1-3 seeded. Timber composed of separate fibres, but surprisingly strong, and used for many native domestic purposes. Often in or near running streams, but sometimes equally luxuriant on high dry sand. Frequent throughout the Province; nowhere abundant. Fit for cultivation as an ornamental tree.

PLATE LXXXVI. 1, Point of branch, with ordinary leaves; 2, Fruiting panicle; 3, Flower; 4, Tree, general aspect (reduced); 5, Leaf from coppice shoot.

228. **ALOE**. Leaves succulent, often provided with spines at the margin or on one or both surfaces. Inflorescence racemose on a simple or branched peduncle; flowers red or yellow in the arborescent species. Perianth-tube cylindrical or curved, the 6 lobes nearly equal. Stamens 6; ovary 3-celled; each cell with many ovules; fruit a dry 3-valved, many-seeded capsule, the seeds flattened. Erect, simple or branched succulent arborescent plants; a few are small herbs. About 100 species, mostly African, from several of which medicinal aloes are obtained. 2 species, 6, Mangai, with simple stems 2 metres or more in length were seen occasionally in the Province, but nowhere abundant; the smaller, *A. maculata*, 4, Hungani, is common everywhere, and *A. constricta*, Baker, and *A. cryptopoda*, Baker, both caulescent species, are recorded from the Zamhesi valley near Sena.

*A. Bainesii*, Dyer. *Vern. name*—4-6, Kalangungu. A dichotomously branched tree, 7 to 20 metres in height, 60-130 c.m. diameter of stem, with its leaves in terminal rosettes. Leaves 45-60 c.m. long (or longer on coppice shoots), 4 c.m. wide at the clasping base, narrowed gradually upward, and with a few small prickles on the margin, but none on the back. Raceme many-flowered, simple or with 1 or 2 branches. Timber too soft for technical work. It occurs sparingly in the M'Chopes Forests and in Magenja da Costa; it is also a native of Natal and Transkei.

#### FAMILY LXI.—PALMACEÆ.

Flowers small, regular or nearly so, unisexual in the under-mentioned genera, and arranged in a spadix, usually enclosed in a spathe. Sepals 3; petals 3; stamens 6 or more; ovary superior; fruit a ligneous nut containing 1 seed. Erect Palm trees, usually unbranched, with pinnate or flabellately divided leaves.

229. **PHŒNIX**. Leaves pinnate, segments in duplicate in veneration. Flowers dioecious; spathe single. Fruit leathery or pulpy outside. About 12 species natives of Tropical Asia and Africa.

*P. dactylifera*, Linn. The Date Palm, having fleshy fruit, is a native of Northern Africa, and is mentioned in "Flora of Tropical Africa" from Portuguese East Africa on the strength of "one solitary tree outside the stockade of Sena" recorded by Kirk; other localities further north being given, though a note is appended:—"Owing to this species having been cultivated throughout Tropical Africa from remote times, it is difficult to decide where it is truly indigenous." I did not see it, either wild or in cultivation.

*P. reclinata*, Jacq. *Vern. names*—1, Wild Date; 4, Mikondyu; 6, Ingenda; 13, Idama. Stem erect, 1-3 metres high, unbranched above, but renewed by coppices from the base if the main stem be damaged. Leaves 1.5-2 metres long, numerous, dark-green, shining; pinnules lanceolate, 35-50 c.m. long, the lower pinnules



often reduced to spines. Fertile spadix much branched, 60-100 c.m. long. Fruit 1-2 c.m. long, elliptical, red, with a leathery skin, and hard stone grooved on one side. Frequent near water, or where there is sub-soil moisture throughout the Province; also in Eastern Cape Colony, Natal, and Tropical East and West Africa. The natives here make no use of this palm.

230. **RAPHIA.** Leaves pinnate; segments reduplicate in veneration. Monoecious and without common spathe. Fruit 1-seeded, covered with hard shining scales. About 12 species, several of which yield useful fibre, the fibre from the young unopened leaves of *R. Ruffia*, Mart., being largely used as string in Madagascar, and also exported to Europe from there, for horticultural work, under the name "Raffia grass." The published descriptions of the species are exceedingly unsatisfactory, the distinguishing characters being mostly the number of stamens, the form of fruit and of its covering scales, and the number of rows of these scales. It seems to me likely that the number of species will be reduced on better acquaintance. I believe I am correct in referring the species which occurs freely along streams in the forests of Magenja da Costa and Nhamacurra, and also occurs occasionally in M'Chopes and Gaza, and I understand at Mavotta, Lorenzo Marques, to *R. vinifera*, P. Beauv. Vern. names are—5-6, Mali; 10-11, Nyiad. It forms a stem 2-7 metres in height, 20-30 c.m. in diameter, and has leaves 5-10 metres long, the midribs of which are in great demand for making rafts, light gates, doors, &c. For the latter purpose they are simply placed side by side, cut to length, and hardwood pegs passed through a hole in each, 1 at the top and 1 at the bottom, 1 outside upright being a foot longer at each end than the others, and playing in a hole in a log at the base, and tied to the gate-post at the top, thus acting as hinge, and a very light and serviceable door is formed. The pinnules of the leaves are spiny on the margins, especially on seedling plants, which on the Mogugude River, between Mocimbella and Muebeba, are produced in great abundance. In most places, especially southward, the trees have only 3 or 4 leaves each, the natives removing each leaf for its midrib as soon as it is fit. No liquor is used from this species north of the Zambesi, but in the extra-tropical districts the crown is sometimes cut off for the sake of the sap which flows from it and forms a palm-wine. Against this practice and also cutting young leaves, there should be legal restriction if it can be carried into effect. *R. vinifera* occurs on both East and West Africa, "The Bamboo Palm; wine made from the sap of the trunk is called *Bourdon* by natives of Oware and Benin."

PLATE XCVIII. B. 1, Tree, general aspect (much reduced); 2, Spadix; 3, Fruit; 4, Scale on same (inverted); 5, Seed.

231. **BORASSUS.** Dioecious. Leaves fan-shaped. Male flowers many, in pits on the spadix. Male spadix smaller than the fertile.

**B. flabellifer**, var. *æthiopicum*, Warb. Vern. names—1, 2, Borassus; 10, Morumbe. Stem 12-20 metres in height, 25-30 c.m. diameter, often with a swollen part near the middle. Leaves clustered at the top of the stem, 2-3 metres long and rather wider, the petiole of equal length and armed with spines along its margin. Spadix 1-3 metres long, simply branched, that of the male plant shorter than the fertile. A lofty and striking palm with straight unbranched stem, seen of large size in Zuvalla and at Quelimane and Magenja. Though not always associated with present habitations, I doubt if this species be indigenous, and think it may have been brought south long ago from one of its many habitats further north. In the "Flora of Tropical Africa" it is stated "In Unyamwezi district (German East Africa) the young ones are called 'Meelalla' and the leaves furnish thatch, rope, sieves, fences, firewood, and flageolet reeds, the roots are boiled and eaten in times of famine, and a sweet insipid toddy is extracted, whilst on the Nile the leaves are made into strong white baskets and mats for markets, according to Speke and Grant." The name "Meelalla" given above for the young palms is suspiciously like the name Ilala used for *Hyphæne crinita* wherever that species grows, which is used for all the purposes mentioned above. Here *Borassus* is used for the production of surra (fermented liquor) but not for other purposes.

232. **HYPHÆNE.** Dioecious. Leaves fan-shaped. Male flowers solitary in pits on the spadix. Male and female spadices alike.

**H. crinita**, Gaertn. Vern. name—1-16, *Ilala*. Stem simple, or sometimes branched as a result of accident or tapping; up to 3 metres in height, 25-30 c.m. diameter; erect. Leaves fan-shaped, 1-2 metres in length and width; petiole armed with spines. Spadix 60-100 c.m. long, branched. Fruit 5 c.m. long, 4 c.m. wide, oblong, fibrous under the skin, and with a hard shell inside. Frequent in the sandy soils throughout the Province, also in Natal coast, extending to Pondoland, and in German East Africa, British Central Africa, and Madagascar. The young leaves yield excellent fibre, in demand everywhere for native purposes such as tying mats, &c., the split leaves are plaited into baskets close enough to hold Kafir beer and grain, and also made into hats, purses, tobacco pouches, &c., and the tapped crowns yield sap from which a native "wine," highly intoxicating if old, is obtained. The seeds have a low value for the manufacture of trinkets from its "vegetable ivory."

**H. coriacea**, Gaertn., described as differing from *H. crinita* in having a dichotomously branched and sometimes much-branched stem is recorded from the mouth of the Zambesi and other localities as well as from Pondoland. Branched stems of *H. crinita* occur anywhere as the result of tapping, damage, fire, &c., and though this matter did not come under my notice till after I left the Province I do not think the branched plants anywhere are specifically distinct. Rev. R. Baron ("Kew

Bulletin" 1890, p. 211) speaks of the fruits of *H. coriacea* being largely used in the manufacture of rum in Madagascar. This is probably a mistake, the liquor being made here only from the crown-sap, not from the fruits.

**ELÆIS GUINEENSIS**, Jacq., the *Oil Palm* of West Africa is recorded from several localities in Eastern Africa including Nyasa-land, but is not indigenous in our area so far as I am aware. It is in cultivation at the Companhia de Zambesia's factory in Quelimane, fruiting when only a few years old.

**COCOS NUCIFERA**, Linn. *Vern. names*—1, Cocoa-nut Palm; 2, Coqueiro. Is very abundant throughout the more coast-ward portions of the Province, and its cultivation is the main industry there. Probably not indigenous, as it is seldom seen away from cultivation, and even as an escape it is not common. The Portuguese locality given in "Flora of Tropical Africa" is "a few trees above Tete on the left bank of the Zambesi, *ex Kirk*." Are these indigenous?

#### FAMILY LXII.—PANDANEÆ.

Perianth none; flowers dioecious, arranged densely on a bracted spadix; leaves undivided, ensiform, spiny on the margins and on the underside of the midrib, sheathing at the base, and arranged in close spiral order.

233. **PANDANUS**. Trees or shrubs, having the main stem straight and erect, and with spreading more or less whorled side branches. Adventitious supporting aerial roots are often produced from the lower part of the main stem. About 16 African species, of which several belong to German East Africa.

**P. Livingstonianus**, Rendle. *Vern. names*—10, Medeleli or Mijilela. Although fruit or flower was not seen, this is presumably the species found in great abundance along many of the rivers and vleys of Magenja da Costa and Nhamacurra. This produces narrowly pyramidal trees of 10-20 metres height, with numerous short branches more or less in whorls. Stem 15-20 c.m. diameter, set with short prickles. Leaves on mature trees 30-45 c.m. long, and 2-3 c.m. wide; those on young vigorous trees 0.5 to 1.5 metres long, 5 c.m. wide; margin and midrib toothed. Aerial roots few or many. It grows gregariously, and almost alone in suitable sites, usually standing in or near running water. *P. Livingstonianus*, which is recorded from the Zambesi Delta, mouth of the Luabo River, by Kirk, is described in "Flora of Tropical Africa" as having the drupes flat at the top, "with a central sub-obtuse umbo," while *P. Petersii*, Warb., from Mozambique, on the banks of the Lucuare and Munanche Rivers, appears, from description, to differ only in having on the drupe a "free apex  $1\frac{1}{2}$  lines long, convex, pyramidal, scarcely costate or umbonate."

The Pandanus timber is found in Magenja, one of the strongest and most durable, withstanding white ants, and is consequently used for bearing-beams in bridges, and other work where fair durability and strength are required.

PLATE XCVII. B. 1, Part of stem; 2, Part of leaf; 3, Tree, general aspect (much reduced); 4, Cone.

#### FAMILY LXIII.—GRAMINEÆ.

Flowers hermaphrodite or unisexual, sessile, in heads or spikelets, where they are enclosed separately within imbricated bracts. Leaves undivided, not closely spiral. The Grasses are usually herbaceous, but the section Bambuseæ includes the tree-like Bamboos, of which 1 species, 3-7 metres in height and 4-5 c.m. in diameter is frequent in moist spots in the forests of Magenja da Costa, while large Bamboos 10 c.m. in diameter were seen in use as Mashila-bearers which had been brought from the Shire district, and were evidently of a different species. No inflorescence was seen of either, so identification must be held over till these are obtained. The larger species is fit for many domestic and technical uses; the smaller is only sometimes large enough for whiststicks, and these are not in demand where it grows.

## CHAPTER IV.

### The Timbers.

HAVING in Chapter III. afforded the means of identification of at least all the more common and more important trees found in the Province, I now come to deal with the timbers produced by them, leaving recommendations concerning the means of extraction and other economic questions for Chapter VI. The one difficulty which presents itself everywhere is that there is no proof available concerning the value of almost any local timber. Certain local species are well-known in South Africa, and as their timber qualities and properties have already been dealt with in my "Forest Flora of Cape Colony," I have considered it would be redundant to repeat these here, especially since there is little local experience to add in these cases, except the fact that theoretically any species produces timber of more rapid growth, often softer, less strong and less durable, when grown under more tropical conditions than when grown in the mountain forests of the south. This, however, has not been proved here so far; indeed, in actual forestry it is hardly worth proving, since few of the Cape kinds form a commercial proportion here, and the few species which do so are represented in the Cape by outlying stragglers rather than by normal stock.

Again, the soil conditions are so totally different, being for the greater part either sand or alluvial mud here, as against mountain forest humus there, that the probability of results being the same is very small. In that invaluable work, Gamble's "Manual of Indian Timbers," many of our species and many Indian species, closely allied to other local kinds, are dealt with, but there also local conditions differ considerably from ours; indeed, even within this Province local conditions vary to an extent which renders any exact description of specific qualities almost impossible, except after a close acquaintance extending over several years. But, as already mentioned, there is little local experience to work upon. The population is native; the native hardly requires timber, and his few requirements do not show what the European wishes to know. With him, hardness is usually a fault, since it renders the tree difficult to fell and the timber difficult to work; strength counts for almost nothing, elasticity for very little; durability and resistance to white ants are of considerable importance; lightness is a high quality for canoe work; bark suitable for cloth, string or water-baskets is valuable; and fruit which is edible, or especially fruit from which wine or spirit can be produced, is the highest qualification a tree can have. The trees reserved in native gardens in accordance with native practice are entirely of the two latter classes; for the timber itself no tree is reserved. The few Europeans scattered through the outlying districts have generally accepted the native evidence as to what is durable and easily worked; these then are the qualities given prominence in their domestic economy. I find it is most deceptive to take the appearance of a timber when freshly cut as proof of what it will be when seasoned, as for instance that of the Fever tree, which when felled has the appearance of a good sound hardwood, while three months afterwards what the borers have left is absolutely worthless, as indeed is the timber even if preserved from borers. So also with Impeshu and several other well-known instances; and this made me hesitate to use such evidence in regard to kinds less well-known. Fortunately several considerable collections of timber specimens have been prepared, mostly under instructions from His Excellency the Governor-General, who has taken a deep interest in the utilization and realization of the timber products of the Province, and as I had an opportunity of examining these, I consider that this part of the subject will be best met by a description of them, supplemented by what my observation in the forest and elsewhere could add. The specimens were collected by the various Administrators one or more years ago, and the local native name either written upon the log itself or written on a gummed attached label, consequently there is little chance of error after leaving the district in which each was collected; while (apart from spelling) the exactness of the native terminology renders identification, in so far as they are under known names, fairly accurate, as has been confirmed, in some cases at least, by fresh material. But the spelling varies much, each Administrator giving his own interpretation to the native pronunciation, and I find that in many cases my spelling does not agree with that given by these officials, who naturally use the Portuguese method of reducing the sounds to phonetic spelling. There are also included many specimens, mostly from Magude, Manhica, Sofala and Upper Gaza (which localities I did not visit), under names which I have not met elsewhere, and which must consequently remain for the present not botanically identified. I feel sure, however, that most of the species represented by these logs are described in Chapter III., and will eventually have the native and botanical names connected, so I have not hesitated to describe these along with the others, and thus utilize the material available, even at the risk of describing the same timber twice. Wherever I felt reasonably sure, the botanical name has been added; where I felt doubt or had nothing to go by, it has been omitted; in every case where the botanical name is present it has been added by myself from these sources. I have retained the spelling given by the Administrators, even though I did not concur in it, as it will probably be more easily followed than what I have given, which again suits British usage.

The first collection seen was that at Quisico, prepared  $1\frac{1}{2}$  years previously by Administrator Alves of Zuvala, who takes a strong interest in the local forests, as well as in the local natives and their lore, and who personally knew the more important local trees as well as the natives themselves. The specimens were half-sections, 20 c.m. long, sawn to form and then polished with the leaves of *Ficus silicea* (Barowre).



## SPECIMENS FROM M'CHOPES (QUISICO).

- Moanjwa** (6), *Cordyla africana*. A beautiful yellowish rather heavy timber, solid, somewhat oily, with long markings; rings 2-8 per inch, with numerous intermediate rings; takes a fine surface; pores and rays not visible; weight about 60 lbs. per square foot. Timber mostly heartwood, with about 2 c.m. of soft sapwood. Bark grey, not deeply furrowed, or almost unbroken on the surface, 4 m.m. thick. A valuable timber, and the tree grows to a very large size. It is almost the only timber used by the natives in the construction of their native pianos (Mirimha). Another tree, not identified, bears a very similar name (6) Moonja, also has yellowish timber, but darker in the centre, or in old trees rather reddish, and the specimens seen were somewhat damaged by borers.
- Tsula** (6), *Sclerocarya caffra*. Very light spongy wood, fit only for brake-blocks. Bark thick, rough. Specimens badly bored by insects. Sometimes used for dug-out boats, (Mandea).
- Mo-esu** or **O-heso** (6), *Albizzia fastigiata*. Very light (about 40 lbs.); heartwood dark grey, sapwood lighter grey; takes a fair surface; used locally as boards for doors and is not much warped. Good value for its weight. This tree is largely used in Natal for naves and is almost worked out in suitable sizes there. Throughout this Province it is abundant and in suitable sizes, and a considerable export business might be done in naves, either manufactured or in the short log.
- Chirol** or **Chival** (6), *Commiphora Harveyi*. Very light, grey, dense for its weight, consequently keeps light in water, and is one of the principal timbers for rafts. Grows from truncheons and is used for street planting at Quisico. Bark thin, papery, green.
- Barowre** or **Barahuta** (6), *Ficus silicea*. Light weight; timber nicely figured in longitudinal section, equal, yellowish, very open consistence; rays pronounced, close; a central core containing pith. Too open and spongy to be of timber use. Leaves very rough, used for polishing.
- Kalangungu** (6), *Aloe Bainesii*. Very light, dark, open, almost like Belhambra (*Phytolacca*) but rings less distinct. Useless for technical purposes.
- Zumbane** (6), Bark grey, compact, (like that of *Nuxia congesta*), softish, thin. Timber yellowish, fairly compact, not heavy; rays very close, irregular; pores few; grain almost absent; cleans to a nice board, and as it is a large tree would be useful for this purpose.
- Incasu** (6), *Conopharyngia ventricosa*? Bark yellowish-grey, fissured longitudinally at 3-5 c.m. distances, thin, soft, papery, but not in flakes. Timber fairly heavy, yellowish-grey, all alike, fairly dense, showing no rings, taking a good surface; fit for boards.
- Neneba** (6), (not Mneba). A valuable hardwood timber of fair weight (about 55 lbs.), yellowish with a tendency to a reddish tinge; rings distinct at about 6 m.m. distances, with numerous intermediate rings. Rays not visible; bark thin, in small squares. Log 25 c.m. diameter, with no sapwood.
- Chivari** (6), *Baphia ovata*. A valuable hardwood, about 63 lbs. weight, with decided yellowish sapwood, 2 c.m. on 15 c.m. long, and a very hard dense black heartwood; rings distinct, black, at 5-7 m.m. distances with numerous intermediate close circles. Looks like Wild Olive, takes a good surface and is too hard for the natives to cut. Bark uncracked, grey, 4 m.m. thick.
- Lulu** (6), *Trachylobium mossambicensis*. A light yet compact and possibly useful timber, looking heavier than it is. Timber yellowish, somewhat figured; rays abundant and distinct, rings absent, pores scattered. Bark grey, uncracked, 4 m.m. thick. Specimen 24 c.m. diameter has no heartwood. In this condition it might be useful for boarding hut I believe with age it has a hard dark heartwood.
- Cherole** or **Xirrole** (6), *Randia dumetorum*. A compact heavy yellowish red wood from small tree. Timber dense, equal, nearly like sneezewood, but lighter; looks like an engraver's wood; rings 8 m.m. apart; rays not noticeable. Bark very thin, decorticating in small flakes. Never of large size.
- N'Kanjou** or **MaCajou** (6), *Anacardium occidentale*. Light pinkish-white timber, (say 40 lbs. weight); density fairly good for weight, rings distinct at about 15 m.m. distances, rays numerous, fine. Bark 7 m.m. thick unbroken.
- In-saca-saca** (6), *Olea verrucosa*. Hard dense heavy nearly black heartwood, with small lighter-coloured sapwood. Well known in Cape Colony as an everlasting timber. Bark longitudinally streaked, in about 15 c.m. flakes, thin, dark grey.
- Tchonge** (6), *Antidesma venosum*? Heartwood black, with fine surface; sapwood yellowish, also dense and hard. Bark thin, streaked or fissured.
- Tsumbi** (6), *Brachylaena discolor*. A light but compact yellowish timber fit for boards; rings decided, close; rays not noticeable; bark thick, soft, corky in texture, fissured.

- Xanvo**, Shamvule (6) or Shinshamfaan (4), *Ficus delagoensis*. Soft light grey timber; looks sound for its weight, and may cut up into light boards. Bark knotted with fig scars.
- Chicanhe-can-hane** (6), *Commiphora Harveyi*. Timber grey, very soft, light, and open. Used for rafts but of no timber value.
- Bimbe** (6) or **Imbe** (5), *Garcinia Livingstonei*. A rather solid, fairly heavy softwood timber, (about 50 lbs.), yellowish ground with dark line irregularly interspersed, woolly in places. Subject to borers and usually small; bark very thick, fissured into 2.5 c.m. squares. The branches are used as pins for stretching hides.
- Batela** (6), *Bauhinia*, Sps. A dark-coloured light wood (about 45 lbs.) of good surface though somewhat woolly; rings 15 m.m. apart; no heartwood. Bark furrowed in 15 m.m. flakes with occasional cross-bars, 5 m.m. thick, woolly inside. Fit for boards when large enough.
- Rombe** (6), *Ficus natalensis*. A light open yellowish-brown timber, with 12 to 24 m.m. rings and rather spongy nature. Possibly 40 lbs. weight. No heartwood. About equal to deal for boards. Bark unfissured, thin.
- Moatenjetu** (6). 30 c.m. log; light but dense reddish-yellow timber, about 42 lbs. weight; not spongy and looks valuable for boards or furniture. Rings 6 m.m. apart or less, decided, and solid between. Slightly bored by small borer. Bark 6 m.m. thick, solid, dark-grey, unfissured and with no markings. Always tree of small diameter but goes to height.
- Rengu, Rengele** or **Murengu** (6). A small log, with pretty red heartwood and yellowish sapwood. Heartwood very hard, would make pretty sticks. Bark thin, deeply fissured in 8 m.m. pieces.
- Satsa** or **Sasa** (6), *Rhus longifolia*. An almost black timber surprisingly light for its colour, possibly 50 lbs. weight, almost without sapwood. Wood equal, dense; rings indistinct at about 6 m.m. distances. Bark rather thick, brown, in irregular squares, and rather deeply fissured at about 2.5 c.m. each way.
- Xina** or **Sina, Sende** or **Matende** (6), *Azelia quanzansis*. A somewhat dark-grey, open, or in the heartwood fairly dense light timber of fine surface and first-rate for boards but somewhat subject to borers; rings indistinct at about 6 m.m. distances, rays not noticeable; no heartwood, weight about 40 lbs. A very large tree; bark clean, unfissured, but with decided horizontal bars at about 2.5 c.m. distance.
- Saba** or **Mussaba** (6), possibly *Bridelia micrantha*. A rather open light somewhat spongy but equal and apparently useful board timber. Rings 8-12 m.m. apart. Bark thin, fissured but not deeply, and in squares of 1.5-3 c.m.
- Rungulo** (6), *Mimusops Henriquesiana*. Compact, firm, light timber, (45 lbs.), of yellowish colour and very distinctly and finely marked with parallel lines about 1 m.m. apart, but with more distinct rings about 12 m.m. apart. Somewhat bored by large borer, but otherwise fit for boards, &c. A very large tree; bark thin, dark, slightly fissured in small squares.
- Fuleti** (6), *Trema bracteolata*. Very light open timber (35 lbs.) with 12 m.m. rings and somewhat stringy timber between, like that of *Celtis*. Bark thin, grey, unfissured; cambium used for fine string for fixing assegai head to handle. Useless as timber.
- Nhuco** (6). Log 15 c.m. diameter. A light compact grey timber, 40 lbs. weight. Rings 4 m.m. apart; bark not deeply furrowed but streaked somewhat, rather thick. Not a large tree and consequently not fit for boards.
- Nungwane** (6), *Xanthoxylum capense*. A solid yellow hardwood timber with decided grain. Outer wood somewhat woolly, inner very dense and homogeneous, like an engraver's timber; weight about 55 lbs. Useful for planks, poles, &c. where large enough. Bark streaked.
- Matandere** (6). Log 15 c.m. diameter. A compact grey timber, about 50 lbs. weight, showing no variation or marking, and taking good clean surface. Specimen star-cracked. Rings about 2.5 m.m. apart; rays not visible; bark thin, not deeply fissured, but in large squares. Not a large tree; if large, its boards would correspond with Yellow-wood.
- Ramba** or **Muramba** (6), *Strychnos spinosa*. A somewhat spongy timber with black and yellowish lines throughout, the latter soft. No heartwood, but a general dark appearance, 35 lbs. weight, and presumably not of value. Bark rather thick, somewhat flaky, and inclined to be corky. Log 20 c.m. diameter.
- Tingare** (6). Log 15 c.m. diameter without bark, but grows to be a large tree. A light spongy timber of rapid growth; rings 12-18 m.m. apart; pores numerous; colour grey, equal. Somewhat bored by small borer. Used for drums and parts of native pianos (Miringba). Might make light boards.

- Chicush** (6), *Lonchocarpus mossambicensis*. A very unusual timber, light, hardly solid, with whitish sapwood and dark almost black heartwood, beautifully streaked. Rings about 12 m.m. apart, with numerous intermediate small rings which give the longitudinal streak. A pretty timber, about 40 lbs. weight. Bark unfissured, grey, 4 m.m. thick.
- Nyammarre** (6). Log 20 c.m. diameter, light, and rather spongy, very like *Trichilia*, reddish, but more open and lighter (40 lbs.); rings 6 m.m. apart; takes good surface, and is not damaged by borers.
- Xissasala** (6), *Gardenia Thunbergia*. Hard and heavy (55 lbs.), yellowish-grey, with rings 3 m.m. apart. A small log, from a usually small tree. Bark in small thick flakes.
- Nyama-m-hutyana** (6). Log 5 c.m. diameter, always small tree. Timber yellowish, equal, rather light. Bark unfurrowed, woolly inside.
- Tsumbi-lumi** (6), *Vernonia senegalensis*. Light-grey spongy timber, of good surface, without noticeable rings or rays. Bark rough, somewhat fissured, thick, woolly inside. Specimen bored by small borers.
- Tondo** or **Tzontzo** (6), *Brachystegia appendiculata*. Compact timber of medium weight (50 lbs.), reddish-grey colour, with good surface; rings 6 m.m. apart; pores scattered, very large; rays not visible. Bark unfissured, used for water-vessels, and the cambium for cloth, cordage, &c. In view of the enormous quantity of it, this is probably the most important tree in M'Chopes and neighbouring districts; it is rather a medium-weight, half-hardwood than a heavy hardwood, at least in so far as the dry specimens seen by me were concerned, but possibly in mature trees the heartwood may be harder.
- Cua-cua** (6), *Strychnos Gerrardii*. Log 20 c.m. diameter. Open porous timber, nearly like palm-formation; pores large, in regular circles, about 1 m.m. apart each way. Timber fairly heavy (50 lbs.), surface bad owing to pores. Length usually short, so useless for planting; may have a use in fancy work. Bark thin, flaked and decorticating.
- Mnebe** or **Ziba** (6), *Andradia arborea*. The best hardwood seen; beautiful close grain of equal density, good surface and fine colour, reddish toward the centre, lighter outward, but without sapwood. Specimen somewhat star-shaken; rings 5 m.m. apart; rays not visible; appears greasy. Bark thin, light-grey, rather deeply and closely furrowed. Well worth attention as a valuable hardwood, and one found in considerable quantity in the southern districts.
- Cusso** (6), *Trichilia emetica*. Reddish, rather light and somewhat woolly timber, similar to the same species in the Transkeian forests, but lighter (40 lbs.) and more woolly. Rings 12 m.m. apart; rays not visible; bark thin, unfurrowed. First rate for boards of considerable width, and obtainable in quantity. Specimens are not damaged by borer, but in Cape Colony it is considered advisable to give this species water-treatment to preserve it.
- Indulu** (6), *Celtis lactea*. A rather heavy timber (50 lbs.), dark, nearly black inside, with wide greyish sapwood. Rings 8 m.m. apart, with numerous intermediate rings, and consequently longitudinal streaks in board; rays not visible; sapwood badly bored; bark unfurrowed but streaked. Fit for boards, but unequal colour is against that, as also borer damage. Does not look like either a *Celtis* or a *Ficus* timber (see Chapter III.).
- Sicarit** (6), *Acalypha*, Sp. Log 8 c.m. diameter. A dense, grainless, ringless, whitish timber, never large, and consequently of little use. Surface good. Bark grey, not furrowed, but streaked in small furrows.
- Thendjele** (6). A 15 c.m. star cracked specimen of a compact, dense, darkly yellowish wood of medium weight and good surface; rings regular, 4 m.m. apart, darker, but compact throughout. No pores; no visible rays; bark thin, grey, flaky; small tree.
- Dane** or **Madane** (6, 7), *Spathodea alba*. A light-grey, very equal timber, of good surface, better than *Trichilia*, less red; weight about 45 lbs.; rings 12 m.m. apart, with many intermediate pores; rays not visible. Valuable board timber, not bored. Bark thin, flaky. Sometimes a large tree.
- Chicacute** (6), *Combretum Kraussii*. A dull yellow timber, shot with irregular black streaks (possibly fungoid); surface fair; wood rather spongy; looks tough; weight about 50 lbs.; rings 12 m.m. apart, indistinct. Bark slightly fissured in rather close pattern, thin. May do for planking, boards, &c.
- Tole** (6), *Mimusops obovata*, or *M. caffra*. A dense hardwood of dark reddish-grey colour; good surface, and equal throughout; rings 4 m.m. apart; bark grey, hardly furrowed. A valuable timber. *M. caffra* is a fairly large gnarled tree along the coast, elsewhere small. *M. obovata* is large more inland.
- Mkurre** (6), *Eugenia guineensis*. Very dark grey timber, shot throughout with almost black; somewhat woolly on end but takes a good surface. Rings about 1 m.m. apart, without wider rings. Weight about 50 lbs. Bark grey, thin, unfissured. A good half-hard board timber but of bad colour; suitable however for fancy work.



- Chintomane** (6), *Maba natalensis*. A fairly compact, nearly white timber, with smooth unfissured bark. Seldom a large tree.
- Chailo** (6), *Ficus utilis*. Timber reddish, reasonably compact, somewhat greasy, quite fit for boards, &c. Rings about 12 m.m. apart but with many fine intermediate rings. Rays and pores not evident; weight about 40 lbs. Specimens bored by small borer. This might make useful softwood boards.
- Manyanhe** or **Inyanhe** (6). Log 15 c.m. diameter with 10 c.m. black heart-wood and yellowish white sapwood, all somewhat spongy, but heart-wood greasy and looks lasting. Too soft for boards, and somewhat bored. A large tree; bark thin, unfissured, greenish.
- Fecamati** (6). Log 24 c.m. diameter. A softwood of grey colour, good surface, and regular equality. Rings 5 m.m. apart, without intermediate rings; timber somewhat porous; bark thin, unfissured. A good board, better than *Trichilia*, lighter, of lighter colour, and more consistent equality.
- Tsaru** (6), *Gymnosporia*. Log 15 c.m. diameter from small tree. Colour grey; surface equal; weight 50 lbs.; rings 12 m.m. apart; pores few. Bark smooth, uncracked.
- Mooia** (6), *Toddalia lanceolata*. Yellowish-white timber of rather poor surface; weight about 55 lbs.; rings 3 m.m. apart; pores and rays not visible. Tough and strong; fit for boards, beams, handles, &c. Bark grey, rough, but not fissured.
- Gauda-sakena** (6), *Rhus* sp. Log 10 c.m. diameter from small tree. Pretty, dense hardwood; weight 55 lbs.; rings 2 m.m. apart, no intermediate markings; rays close and distinct; bark thin, unfissured and flaky. Would be useful if large enough.
- Marriba** (6). A valuable hardwood from a large tree. Heart-wood which is three-fourths of diameter, dark brown or nearly black, equal to walnut, but heavier and more equal, very hard, greasy, and used for axe handles; sapwood yellowish, softer. Rings 2.5 m.m. apart; no pores visible. Bark greenish-grey, not fissured; gets whiter on old tree, and tree gets to 60 c.m. diameter. This is not any of the trees having somewhat similar names in other districts.
- Nymara** (6), perhaps *Celtis Kraussiana*. Light spongy timber, 40 lbs. weight, greyish yellow, with small dark heart-wood. Rings 12 m.m. apart, with about 6 intermediates. Rays and pores not evident. Bark dark-brown, flaky, not furrowed.
- Chicai** (6), *Acacia arabica*. A heavy hardwood, grows along the river-banks, nearly black, streaked with grey, or pinkish; rings close; weight 55 to 60 lbs. Specimen log was 60 c.m. diameter. A strange timber, whose colour is against it for most purposes.

Selecting from the above M'Chopes timbers their order of merit appears to be—

Hardwoods—Mnebe, Chivari, Marriba, in-Saca-saca, Moanjwa, Cherole.

Lighter hardwoods—Nungwane and Moatenjetu.

Light woods—Dane and Sina.

Very light—Oheso and Kuhla (Cusso).

And Tchonge for walking sticks.

#### SPECIMENS FROM QUELIMANE—

The following specimen logs were found in the Custom's Office, Quelimane, as representing some of the best timbers of that district, and are arranged in order from lightest to darkest colour.

- Mahonhe** or **Mugonha** (10), *Adina microcephala*. A dark-grey timber of even grain, and solid texture. Pores few and short; rays absent; rings absent; without a flaw, working to a fine surface and taking varnish well. Weight about 50 lbs. per cubic foot. A timber of qualities apparently similar to yellow-wood (*Podocarpus*), but of more red colour, and closer grained. Found valuable in the Lehombos for wagon-work, &c., and obtainable in quantity of commercial size.
- Mutumbe** (10, 11), *Trichilia emetica*. A pinkish-grey, even, characteristic timber, of light weight (40 lbs.) rather open texture, working to a fine surface, except for the pores. These are unusually large and long (almost as in teak) and contain a woolly pith. A useful light timber, obtainable throughout the Province, especially southward, in quantity and of large size, and might replace deals throughout South Africa, being of similar substance and weight, more dense, probably less heavy, more even, and without any apparent rings.

- Gegómbé** (10). A veneer, 4 m.m. thick, of a clear yellowish-grey timber, of fine surface, cut rather across the grain, but surfaced beautifully, and gives a nice figured appearance when varnished. When unvarnished the timber sparkles as if permeated with resin. A very pretty and useful timber of light colour and light weight, but firm solid texture and probably very durable. Rings 12-25 m.m. apart, irregular; pores few, short; rays inconspicuous. Weight about 50 lbs.
- Imbilo** (10). *Pterocarpus erinaceus*. A reddish-grey rather light porous timber, producing a beautiful specimen. Pores large, long, and fairly numerous, the intermediate tissue taking a fine surface and taking varnish well. Rings and rays indistinct; any broken surface iridescent from resin. This is the most highly valued timber in the Magenja forest, being very durable, ant-proof, strong, easily worked, not too heavy for transport, not liable to warp or crack, suitable for every local purpose, and not even requiring paint to make it durable in house-work. It is there what Teak is elsewhere, and as there is quantity of it obtainable, I look upon this as the master-key in the development of the country. Weight about 50-55 lbs.
- Tumbe or Tube** (10), *Irvingia mossambicensis*. A dark-grey timber of very even, close-grained nature, and probably of value. Weight about 50 lbs.; pores numerous, short, resinous, giving the timber a silvery iridescence when unpolished. Rays narrow, dark. Has the appearance of strength and durability. May be useful for furniture and wagon-building and many less valuable purposes. Found in considerable quantity in Magenja da Costa and Nhamacurra; the trees being usually tall, straight, and of considerable diameter.
- Muçague, Mucossa or Musacosse** (10), *Azelia quanzensis*. A bad specimen, decayed in the centre. Weight about 45 lbs. A dark-grey porous timber, rather brittle under the plane; figured where the grain is crossed. Pores somewhat resiniferous.
- Mgunde or Magundo** (10), *Milicia africana*. A most curious timber, the heartwood dark-brown, the outer wood of mottled colour, streaks of dark-brown solid timber alternating with sometimes less, sometimes much more abundant, light-grey pithy tissue. Weight about 50 lbs.; surface good, and takes varnish well. Woody tissue appears to be regularly either papillate or pitted; pithy tissue containing large resin-vessels, and the whole timber is full of resin. Rings and rays absent. Logs 10 metres long and 6 metres circumference, and others squared to 45 c.m. have been lying at Arenga for some years without protection, and are quite sound, showing no cracks or flaws; it is durable and ant-proof, and fairly easily worked. It grows to enormous size, and is so regularly sound at these large sizes that all the larger dug-out boats are of it, the excavation being mostly by fire, and is carried on for months or years after the boat has been launched. On several occasions 20 or more of my native carriers crossed a river at once in one of these boats, and they do practically all the river freight where civilization has not arrived, and much of it where civilization has been for hundreds of years, as at Quelimane. Evidently from the use of this tree all large dug-out boats are now known generically as *Magundo*, whether made of it or not, the smaller boats being known as *mandea*.
- Manguiera** (10), *Mangifera indica*. A bad specimen of what looks like a good timber. Colour approaching red, or dark-brown; texture close, rays and rings absent; surface and varnished surface good; weight about 42 lbs.; a presentable timber if obtainable sound. The tree, whether or not originally indigenous, is now widely scattered, and one of the largest trees in the Magenja forests. It is of course protected by the natives for its fruits; but is frequently used for large dug-out boats. W. Gamble ("Manual of Indian Timbers," 211) says:—"Wood grey, in old trees sometimes dark-brown with black streaks, and hard; in younger trees coarse-grained, soft. Pores scanty, moderate-sized and large, distinctly marked on a longitudinal section, often sub-divided, and sometimes joined by short concentric bands. Medullary rays fine, wavy, closely packed, interrupted by or bound round the pores. . . . The wood is used for planking, doors and window-frames, in Calcutta for packing-cases, and in Behar for opium and indigo-boxes; canoes and masula boats are made of it. In Dehra Dun and some other tea districts it is in large demand and universal employ for tea-boxes. . . . The bark gives a gum used in medicine; the seed contains gallic acid, and is also so used. The dried kernels of the seeds are eaten in curries or pickled, or ground up, or in other preparations. The fruit is made into preserves and chutnies."
- Meçequesse** (10), *Bauhinia reticulata*. A beautiful red timber not unlike Mahogany, but marked almost like Magundo, with timber abundant and pithy tissue scarce. The arrangement of the pores is curious and they are closed with pith except the centre. The most marketable timber we have for export to Europe as a furniture timber; weight about 45 lbs., and apparently strong for that. Makes beautiful picture frames.
- Muconite** (10), *Excaccaria africana*. A dark-brown timber, streaked darker. Weight about 50 lbs. Texture fine, very equal, dense, close-grained, apparently strong, takes a fine surface and a beautiful varnished surface. Rings about 3 m.m. apart, dark; rays absent; pores minute, few. The timber has a very strong smell, which it never loses, in M'Chopes and Lourenço Marques it is spoken of as *Sandalwood*, and it would probably find a good market in Europe. It is a first-class timber for wagon-work, furniture, &c., widely distributed though somewhat local and more or less gregarious in each locality; it seldom exceeds 30 c.m. in diameter, but is well worth further investigation.

- Muçarandar or Muçandara** (10), *Ceriops Candolleana*. A dark reddish-brown timber of close grain, equal colour, pretty surface, and considerable weight (about 60 lbs.). Not unlike Walnut, but pores larger. Rings and rays absent; pores fairly numerous. A valuable timber where heavy hardwood is in demand, especially for furniture, or ship or railway furniture, but it is seldom of large size.
- Miria or Milia** (10). A dark-red timber, not unlike teak, but darker. Pores abundant, wide, short, highly resinous, and the intermediate tissue netted as in *Proteaceae*. Rays very short; rings absent. Weight about 40 lbs. As a furniture timber this would command a good price. It is also presumably durable, and appears to fit all local requirements but may be of use for shipping also. I failed to find anyone who knew a tree under this name, but it may belong to further up the Zanibesi valley.
- Pangira** (10). Most probably *Lonchocarpus mossambicensis* though the name is not quite confined to that tree. A most beautifully figured timber, having light-grey markings on a very dark-brown ground; weight 45 to 50 lbs.; rings very numerous and close, dark, the white timber pithy, with long open tubes. Of highest value as a first-class furniture timber for export, but probably also useful for local purposes. Abundant in Magenja da Costa, usually about 30 c.m. diameter.
- Pae-ferro** (2), *Swartzia madagascariensis*. The heaviest, darkest, most dense, and probably most valuable timber in the collection. Also I should think the most difficult to work. Weight over 60 lbs.; rings and rays absent; pores minute; surface first-rate, with or without varnish. For piano manufacture excellent; for all high-class furniture work good; for any heavy hardwood work suitable, and a timber that has a value anywhere, (except in its present site). Durable, and not damaged by white ants.

In the collection of timbers at Lourenço Marques some species are evidently duplicated from different localities, and under different names, but as the locality affects the timber to some extent I have put together those from each locality, so far as locality is known, and some species consequently occur more than once.

#### SPECIMENS FROM LOURENÇO MARQUES—

- Goane** (4), *Albizzia fastigiata*. Timber yellowish-grey, dense in the centre, open in the grain in the sapwood, which is rather lighter in colour. Pores large and long; fibres long, continuous; surface fair, when varnished it is very pretty. Growth rapid; weight about 45 lbs. As good as Natal samples, and the trees are much more sound, and fit for yielding naves in quantity. Bark 6 m.m. thick, hardly cracked, rather wrinkled and warted, grey. Tree abundant.
- Maçalemba** (4), probably *Oxyanthus latifolius*. A close-grained dense yellowish timber, without pores or rays, and with no difference between heart-wood and sapwood; polishes to a beautiful clean surface and takes varnish well. Fit for engraver's work, or if it grows large enough for hardwood purposes. Bark thin, solid, red inside, grey externally, slightly cracked and more or less decorticated. Specimen 10 c.m. diameter.
- Jombuge, or Engambuze** (4). Possibly *Avicennia officinalis*, but I think not. A dense close-grained hardwood, showing few pores and no rays nor cracks. Heart-wood 5 c.m. on a 10 c.m. log is almost black; sapwood suddenly light yellow. The two colours contrast well and may be of use in furniture work or walking sticks, &c. The heartwood is too small to be of much use alone (unless it grows to greater size) but is of good quality. Bark thin, stringy, decorticating, entire and of light-grey colour.
- Pama or Bembe** (4), *Garcinia Livingstoniana*. A light-yellowish timber of rapid growth, the rings being 8-12 m.m. apart; grain straight, somewhat figured; knots too many; pores rather few, large; rays prominent. Takes a good surface and takes varnish well. As a wood for boxes and light work is quite fit, though seldom of large size. Weight about 45 lbs. Bark grey, 6 m.m. thick, wrinkled but hardly fissured, red when cut, and having horizontal scars where the numerous branches have been.
- Morentima** (4), *Bersama* (?) *mossambicensis*. A yellowish-grey timber of about 45 lbs. weight; rings 2.5 m.m. apart, pores numerous, long, spongy, giving the timber an open grain fit for light box manufacture, &c.
- Gala-n-gala** (4), probably *Psychotria capensis*. A dense close-grained yellowish-brown timber, taking a beautiful surface and taking varnish well. Rings about 4 m.m. apart; pores few, minute; rays evident, close, fine; bark dark-brown, not much fissured.
- Poane** (4). A dense timber of comparatively light weight (about 50 lbs.), very close grained, beautiful surface, and takes varnish well. Bark very thin, grey, somewhat stringy.



- Nuelambeba** (4), *Clerodendron glabrum*. A close-grained nearly white hardwood, somewhat cracked. Pores numerous, fine; rays evident, not numerous; bark thin, corky, deeply fissured into narrow ridges. Weight about 50 lbs. Fit for furniture and similar work when large enough.
- Mecruce** (no locality), probably *Mocurusse* (11), **Umbitzan** (4), *Weihea subpeltata*. A small branch of a close-grained yellowish hardwood of slow growth and having a small dark walnut heartwood; bark fissured, rough. A pretty wood but the specimen is too small for technical work. **Umbitzan** however grows to a metre diameter in the Lebombo's, and 15 c.m. poles lying at Mr. Sten's consisted almost entirely of black heartwood. It has the reputation there of being exceedingly hard and durable. This is one of the 2 or 3 timbers which were burned into shape and used as hoes before iron hoes were introduced.
- Pesso Impesha** (4), *Albizzia mossambicensis*. A yellowish-grey, half-hard timber, of equal texture, or softer towards the bark, and taking a fair surface, showing well under varnish, though too open and porous for most purposes. Pores few but large; rays not numerous, fine; weight about 40 lbs. Not durable; subject to insect attack; brittle and not strong; fit only for temporary boxes, or such work. Bark thick, woody, roughly cracked outside but hardly fissured; the ash of the bark is used regularly by the natives in snuff.
- Fungusha** (4), *Kigelia pinnata*. A white or yellowish softwood, equal in texture, taking a fair surface, and showing well under varnish. A timber of unusual strength and toughness, 35-40 lbs. weight, and often of considerable size, hence useful for many purposes, such as yokes, oars, wagon-wood, &c., as also for planking, boxes, &c. In Magenja da Costa it is selected for spoons and other domestic utensils. Bark thick, smooth, light grey.
- Catchusoba** (4). Log 7 c.m. diameter. A very beautifully-grained yellowish timber of dense equal texture of fine surface, which would be most useful in furniture manufacture if of sufficient size. Pores few, small; growth slow.
- Umcuchô** (Kuhlu) (4), *Trichilia cinetica*. A grey or pinkish-grey timber of open grain and light weight (40-45 lbs.), largely used in the Transkei for furniture, planking, planks one metre width being there obtainable of good length, and if seasoned in water found to work up into first-rate beautiful furniture, not subject to warp, crack, or suffer from insects. If not water-seasoned it usually is destroyed by borers in 2-3 years.
- Qua-qua** or **Cua-cuo** (4), *Strychnos Gerrardii*. A fairly dense timber of rapid growth up to its size, but containing a very large number of exceedingly large pores, the largest pores among local timbers of equal density. Colour nearly white; weight about 45 lbs.; takes a good surface which shows well under varnish. Seldom of size for timber, and rather subject to have defective holes and gnarls; fit however for boxes, &c. Bark grey, with white blotches.
- Macimbirre**. Presumably this name has been obtained from a Mozambique native, in which case it would be *Pterocarpus erinaceus*, which also grows at Matolla and elsewhere in Lourenço Marques. A pinkish or light-red timber, changing gradually to a lighter sapwood. Surface good, and very pretty under varnish, quite fit for furniture, &c. Weight 40-45 lbs. Bark thick, deeply fissured and cracked, grey outside, red when cut.
- Fochuana**. (No locality.) Log 15 c.m. diameter, with pithy core. A fairly soft nearly white wood, taking passable surface, and fit for planking, house-timber, boxes, &c. Weight 35-40 lbs. Bark warted, wrinkled and lined, but not cracked, stringy inside.
- Nhoebe** (Mnebe) (4), *Andradia arborea*. Small sample; a pinkish, dense, close-grained hardwood, of slow growth, without pores, and with numerous very fine rays. Good for furniture and all similar hardwood work. Bark thin, more or less fissured and cracked. Weight about 55-60 lbs.
- Chese** (4), *Commiphora*. A yellowish rather soft timber of rapid growth; rings about 8 m.m. apart. It takes a good surface, and is fit for planking, boxes, &c. Weight about 35 lbs. Bark thick, woody, irregularly cracked and furrowed.
- Hloho** (4), *Euphorbia grandidens*. Timber very light, unfit for technical purposes. Bark thin, yielding latex.
- Chimubocantha** (4), **Chimumbuncanhe** (4), **Chibumbocanhe** (5) (Shumbu-n-Kanye), *Commiphora caryacifolia*. A very light and pinkish-white softwood of rapid growth; rings about 8 m.m. wide, surface fair, showing well under varnish; rather open and porous; pores small, numerous; weight 40-45 lbs.; fit for planking, boxes, &c. Bark reddish-brown, smooth, nearly white, with a somewhat papery surface, and woody or fibrous red interior.
- Chissenge** (4), *Commiphora* sp. Weight about 30 lbs. Timber white, cuts to a good firm surface. Quite fit for boxes, &c. Bark thin, greenish, decorticating in transparent papery flakes.

- Sale and Insale** (4), *Strychnos spinosa*. A white rather light timber with a curiously honey-combed appearance in the cross horizontal section, the numerous white rays being connected at short intervals by similar cross hands, leaving the interspaces full of solid, dark horn-like tissue. The surface is not good, the grain being short and brittle, but it is prettily marked by the pores and rays, and under polish the graining shows very prettily. Bark rough, hard, woody or firmly corky, light grey, very irregular in its surface, but not fissured or deeply cracked.
- Mocolo**. (No locality.) A soft porous white wood with a thick nearly white bark, wrinkled outside. Log 10 c.m. diameter.
- Chibondwana** (Chivondwana) (4), *Combretum Kraussii*. A pinkish-white timber of equal density throughout, weighing about 45 lbs., and taking a passable surface for rough work. Pores numerous, medium size; rays very numerous and fine; rings about 8 m.m. apart. Fit for planking and similar work, and grows to a large size. Bark dark, very rough, but not fissured deeply.
- Chichanfana** (Shin-sham-faan) (4), *Ficus delagoensis*. A pinkish-white timber, taking a fair surface. Pores large but not numerous, rays plentiful, fine; weight about 35 lbs. Fit for planking, boards, boxes, &c. Bark thick, warty and rough, but uncracked; dark-grey on the surface, pinkish inside, and exudes latex freely.
- Nulla** (4), *Trachylobium mossambicensis*. Specimen 18 c.m. diameter. A nearly yellow or greyish-white timber, rather darker towards the centre, and shot with dark streaks, dense and close-grained; figured with minute cross-grains; weight 45-50 lbs.; pores rather few, medium size; rays numerous. Surface fair, that of the heartwood good. Grows to be a large tree. Fit for planking, housebuilding, furniture, and other half-hardwood purposes. Bark very thin, grey, roughly surfaced, but without fissures.
- Cua** (Mkuao) (4), *Ficus capensis*. A light white softwood, somewhat warped, taking fair surface; pores fairly numerous, medium size, rays distinct, not close. A tree of rapid growth; timber fit for boxes and other temporary planking. Bark fairly thin, light grey, smooth or more or less warted.
- Chafuta** (4-5), *Azelia quanzensis*. Log 20 c.m. diameter. A white, half-hard, or almost soft timber, inclined to be brown in the centre, and known to be regularly pinkish-brown in old logs. Surface fair, pores numerous, large; weight about 45 lbs. About as hard as Yellow-wood, and fit for similar work, quartering, planking, boxes, &c. Bark 8 m.m. thick, roughly wrinkled, grey.

## SPECIMENS FROM MARRACUENE AND NAMAHACHE—

- Ngomazembe** (4). A close-grained hard yellowish timber of about 60 lbs. weight. Rings close, 1 m.m. apart, fine; rays not visible. Fit for fencing poles, and looks durable. Bark thin, grey, slightly wrinkled, more or less decorticated.
- Mtoma** (4), *Cyclostemon argutus*. Log 12 c.m. diameter. Timber grey, rather soft, about 45 lbs. weight, and showing no special qualifications. Probably better with age. Evidently not a *Diospyros*, which has the same name.
- Mkanke** (4). A dark-brown hard heavy timber of slow growth, the rings being 1-2 m.m. apart. Pores large, rather numerous, resinous, timber solid, showing no defect, and apparently fit for all hardwood work. Bark thick, rough, dark-brown, red inside when cut. Specimen 20 c.m. diameter.
- Mshlume** (4 or 10), *Adina microcephala*. A dark-grey half-hardwood, weighing about 50 lbs. Rings 2 m.m. apart, pores numerous, large; rays very numerous and fine; fit for planking, &c. Similar to yellow-wood and highly valued for wagon work and domestic purposes.
- Mpad Ngoze** (4). Log 12 c.m. diameter, somewhat cracked. A light timber, nearly white in colour, of rather open texture. Rings about 5 m.m. apart; pores numerous, large; rays not evident. Fit for planking, boxes, &c. Weight 40-45 lbs.
- Mbindane** (4), probably a *Combretum*. A light timber of grey colour. Rings about 4 m.m. apart, with smaller intermediates. Bark thick, whitish, warted and rough; not cracked; fit for boards.
- Caja** (4), *Anacardium occidentale*. A hardy and heavy yellowish timber of apparent strength. Bark thin, grey, cracked into small squares. Weight about 50 lbs. Fit for posts, &c.
- Cuacua-muchô** (4). Grows also in Gaza. Probably *Eugenia guineensis*. A white fairly dense timber of about 50 lbs. weight. Pores numerous, regular and very large; rays inconspicuous. Fit for furniture and other hardwood or half-hardwood purposes. Bark thin, smooth, shining, dark grey.

- Pachá** (4), (*Brachylaena discolor*?). A fairly dense, yellowish, resinous timber, with a corky bark more or less fissured and cracked.
- Chissengue** (4), *Commiphora* sp. A white, soft, exceedingly light timber with smooth decorticating bark, more or less wrinkled horizontally, greenish below, the papery pieces coming off white. Too soft for technical work except floats or brake-blocks.
- Chincaha** (4). A pinkish-grey hardwood, weighing about 45 lbs. Bark thick, rough, very irregularly cracked. Used for posts, &c.
- Ziba** (5, 6), *Andradia arborea*. A brownish-walnut coloured hardwood having a distinct and rather wide nearly white sapwood. Timber dense and hard, with a fibrous but fine surface, figured on the heartwood, and showing well under varnish. Weight about 55 lbs. A very pretty timber, well suited for furniture and other high-class work, or for general hardwood purposes. Rings about 4 m.m. apart. Bark woody, solid, light grey with white blotches, uncracked, but more or less wrinkled, thin, somewhat resinous in the inner layer.
- Guamate** (4). A nearly white timber, having numerous very fine pores, and numerous rays, and taking a good surface; weight about 40 lbs. Well fit for planking, &c., and other half-hardwood work. Bark grey, blotched white, smooth. Grows to be a large tree 60-80 c.m. diameter.
- Tana** (4), (*Dichrostachys major*?). A dense close-grained resinous hardwood, nearly white in colour but usually too small at Lourenço Marques for technical purposes. Another specimen under the same name from Manhica is represented by two logs 18 c.m. diameter, and has pinkish-white hardwood working to a fine and beautiful surface, and taking varnish well. Rings about 2 m.m. apart; pores numerous, small, equally scattered; rays very fine; weight about 50 lbs. A good hardwood or half-hardwood, fit for planking, &c., or even for better work. Bark thin, grey; regularly and very finely cracked and fissured, and also having horizontal grooves at 8-12 m.m. distances.
- Muchô** (4), *Eugenia cordata*. A pinkish-grey timber weighing about 35 lbs. having numerous medium-sized pores and fit for boarding and similar work. A 30 c.m. log shows a beautifully grained reddish-grey timber of fine surface and well fit for furniture work, but the outer 1 c.m. of sapwood is destroyed by borers. Bark warted or cracked, or more or less fissured, light-grey in colour, thick, red inside.
- Mumangate** (4) and **Munangate** (5). A grey timber, darker toward the centre; pores numerous and fine; rays very numerous and fine; weight 45-50 lbs. Surface good and clean; rings 8 m.m. apart. Bark thin, fissured into irregular flakes of 1-2 c.m. The only similar name I know is the Eschuab name Mutagate for *Brachystegia tamerindoides*.
- Mgogobe** (4), (*Castanho* 2). Log 25 c.m. diameter. A dark-brown hardwood of high quality and first-rate colour. Surface good; pores numerous; weight about 50 lbs.; rings 3 m.m. apart. Specimen cracked, and cleared of sapwood, but it is a good timber, distinct from anything else in the collection and certainly not *Calodendron Capense*.
- Chimcuanaon** (4), probably *Schotia brachypetala*. A pinkish timber of fair density, having numerous small pores and few rays. Apparently of slow growth. Bark thin, rough, but not cracked or fissured, grey outside, red inside.
- Manzibana** (4). A hard white timber with thin grey bark, blotched white. Fit for hardwood work.
- Cholê** (4), *Mimusops cafra*. A dense close-grained hardwood timber of red colour. Pores few, rather small; rays numerous, fine. No sapwood, and the timber is first-rate for strength and durability, but seldom in long straight lengths. Bark grey, 6 m.m. diameter, thick, more or less fissured and cracked; deeply fissured in old timber. Found excellent for knees, &c., for boat-building. Common along the coast.

## SPECIMENS FROM MANHICA.

- Bandja** (5), probably *Cordyla africana*. A solid dense hardwood, of about 60 lbs. weight. Colour yellowish, shot with darker figured markings. Pores few, long, not conspicuous; rings about 12 m.m. apart, not prominent. A beautiful timber for furniture work; also suitable for wagon work and general hardwood use. A timber of high quality if obtainable in size and quantity. Log 25 c.m. diameter. Another small log marked "Bandja, Lourenço Marques," and also bearing a label "Sanchiu," does not appear to be the same timber. It is more yellow, closer-grained, and has a grey, somewhat wrinkled, bark.
- Cácho** (5), *Conopharyngia ventricosa*. A close-grained figured yellowish-grey timber, taking a fair surface, pretty under varnish. Pores few; rays fine; weight about 40 lbs. Bark thick, light-grey, soft, corky, deeply fissured with age into irregular ridges, 2-3 c.m. wide. A fairly firm pretty timber, fit for planking, boxes, &c., where large enough.



- Ziba** (5), *Andradia arborea*. A close-grained heavy hardwood, with a pretty reddish-brown heartwood, and a considerable yellowish sapwood. Takes a fine surface, takes varnish well, and is a good furniture timber. Weight about 55 to 60 lbs. Bark thin, grey, smooth except for numerous small horizontal wrinkles.
- Songue** (5), *Podocarpus elongata* (or possibly *Antidesma venosum*). A light timber of comparatively close grain, good surface, and nicely figured; yellowish-grey in colour with darker markings. Pores numerous, small; rays numerous, evident; rings about 8 m.m. apart. Fit for boxes and light work.
- Msamba** (5). (This is the Echuab name for *Sorindeia trimera*, which does not occur, so far as I know, so far south as this). A grey timber weighing about 55 lbs., and having a reddish tinge towards the centre. Rings about 5 m.m. apart; fibres parallel, fine, close, making a dense valuable timber of good surface, and taking varnish well. Valuable for furniture and all hardwood purposes. Bark grey, much cracked and furrowed, red inside, and showing no trace of resin.
- Munchlo** (5), *Eugenia cordata*. (Also marked *Mucusse*; *Ilhe de Bengueria*, probably as a synonym.) A grey timber with pinkish tinge, equal in consistency, light, and still fairly hard, and showing no defect. Surface fair, takes varnish well, and is prettily marked. Bark 6 m.m. thick, whitish, the surface broken into numerous small pieces, the inner portion more stringy and solid. A useful light timber (about 40 lbs.), well fit for planking, boxes, house-building, softwood, &c. Found in quantity, and often good clean material.
- Calarge** (5), probably *Carpodiptera africana*. A yellowish-grey close-grained timber of equal texture and slow growth. Surface good, showing well under varnish; weight about 50 lbs. Fit for furniture and similar work. Bark thin, smooth, grey.
- Filo** (5), *Vangueria infausta*. A beautifully-grained yellowish-grey hardwood, taking a fine surface and showing well under varnish. Good but small.
- Muamba** (5), probably *Chrysophyllum* Sp. (Ngwamba). A yellowish close-grained hardwood, either streaked with rather darker lines or having a darker centre, and showing well under varnish. Pores and rays very fine, not prominent. Weight 50-55 lbs. Fit for yokes, furniture, wagon work, &c. Another specimen of similar timber under the same name is from Magude, and I was informed that it makes a big tree at Matolla, with edible fruit.
- Canha** (5), *Sclerocarya caffra*. A beautifully-grained pinkish-grey timber, gradually more red towards the centre, taking a fair but rather open surface, and showing well under varnish. Weight 40-45 lbs.; pores numerous, of medium size; rays plentiful, fine. Fit for planking, boxes, &c., and pretty enough for rough furniture. Bark thick, much cracked and scaled in old trees but not deeply fissured; pinkish inside. A common tree, usually condemned because its timber does not meet present requirements, but would be valuable if timber were scarce.
- Benguelle** (5)—(bears also a label *Sena*)—*Azelia quanzensis*. A pinkish timber of close dense-grain, weighing about 50 lbs. It takes a pretty surface and shows well under varnish. Good for furniture, planks, &c.
- Inhangatsume** (5)—(bears also a label *Chaquahana*). A pretty-grey hardwood timber of close-grain and good surface, taking varnish well. Weight 45 lbs. Good for furniture, &c. if large enough. Bark thin, wrinkled, dark.
- Inconoba** (5)—(*Inconana* 4). A large tree, used for making plough handles, &c. A yellowish-grey fairly-dense timber, taking a good prettily-figured surface, and showing well under varnish. Bark thick, grey, fissured, woody. Fit for planting and also for most hardwood purposes.
- Arvore de Camphora** (2), *Tarchonanthus camphoratus*. A nearly white timber of medium hardness and strongly scented of camphor. Bark thin, cracked and fissured into irregular squares.
- Cunona** (4)—(also bears label *Bambeta*)—*Terminalia sericea*. A yellow dense hardwood, taking a good surface, streaked darker, and showing well under varnish. Weight about 50 lbs. Fit for furniture, planking, &c. In Lourenço Marques this was the only indigenous timber found in the only wagon-maker's workshop, and it appeared to be used for every purpose. The tree is common and yields good boards up to 60 c.m. width.
- Bamutane** (5)—(also bears label *Muntrane*). A good clear yellowish-grey hardwood, taking good surface and pretty under varnish; fit for furniture, &c. Bark grey, smooth or warted.
- Injole** (5), probably *Mimusops*. A beautiful pinkish timber, deeper in colour towards the centre. Rings 5 m.m. apart, timber medium-hard, taking a good clean surface. Fit for furniture as well as for most hardwood or half-hardwood purposes. Bark grey, deeply and irregularly furrowed and cracked.

## SPECIMENS FROM MAPUTA—

- Chenga** (4), *Acacia arabica*. Timber dark, reddish-brown, close-grained, dense, equal, with a small nearly white sapwood. Pores fairly abundant, rather large, continuous, more or less resinous; rays numerous. Takes a beautiful surface and has good colour, useful for many purposes when large enough. Bark grey, dense, deeply grooved in long more or less parallel 2 c.m. stringy ridges. Frequent but seldom large.
- Camba** (4), *Acacia Xanthophloea* (Fever tree). A nearly white soft timber, of open texture and very light weight (perhaps 35 lbs. or less). Growth rapid; pores large, spongy; rays numerous, prominent. Bark thin, greenish-yellow, without fissures, but with numerous horizontal grooves. Absolutely useless as timber, except it can be planed into fruit punnets, or some such purpose. Very subject to insect attack.
- Munga** (4), *Acacia hirtella*. A close-grained hardwood of grey colour and rather slow growth, dark-brown in the centre with age; rings 2 m.m. apart, irregular; pores rather numerous, regular, large; rays rather few, distinct; weight 55 lbs. Used here only for firewood, and generally too gnarled for other purposes. Bark dark, roughly fissured, in old trees thick and very deeply fissured.
- Kahane** (4). A 5 c.m. cracked sample of a close-grained pinkish hardwood. Too small for technical purposes unless it grows larger.
- Shrituana** (4), *Commiphora Harveyi*. Very light (30-35 lbs.). Timber fairly dense, showing no pores. Fit for boxes, &c. Bark nearly smooth, grey or whitish, not decorticated.
- Icotolo** (4), probably *Mimusops*. Log 40 c.m. diameter. A pinkish-grey timber, working up to a nice figured surface, pretty under varnish. Pores very numerous and rather large; rays numerous, very fine; weight about 45-50 lbs. Fit for planking and similar work, and also for furniture. Bark stringy, 6 m.m. thick, fissured into irregular ridges.
- Cinhana** (Maputa and Manhica). Probably a *Ficus*. Specimens 18 c.m. diameter. A white softwood quite fit for planking, boxes, &c., and taking a fairly good surface. Weight 30-35 lbs. Bark thin, grey, warted or slightly cracked.
- Chiquicha**. This does not appear to be *Lonchocarpus mossambicensis* which bears a similar name in M'Chopes. A grey timber of fairly close-grain but rather rough surface. Pores numerous, rather large, rays very fine and very numerous. Weight 50-55 lbs. Fit for general purposes, half-hardwood or planking. Bark roughly warted, or more or less cracked, dark grey.

## SPECIMENS FROM MAGUDE—

- Mussanga-tanga** (5). A rather open grey hardwood timber, taking a good surface, and weighing about 50 lbs. Pores numerous, small, scattered; rings numerous, fine; timber yellowish and of good surface. One specimen star-cracked. Bark grey, unfissured but somewhat streaked.
- Gubassila** (5). A yellowish-brown or reddish fairly hard timber, taking a beautiful rather grained surface, showing well under varnish. Rings about 1 m.m. apart; pores minute, rays fine, numerous; bark nearly smooth, grey, thin. Fit for furniture work, planking, &c., if large enough.
- Indiziva** (5). A yellowish timber of close-grain; rings 2 m.m. apart, with numerous smaller intermediates. Pores few, small; rays numerous, fine, close; weight about 50 lbs. Bark very thin, smooth or warted. Specimen 10 c.m. diameter, perhaps a young piece of *Inziha*, *Andradia arborea*.
- Mucunico** (5). A yellowish-grey timber, taking a fair somewhat soft surface, and rather streaked with darker markings. Rings about 1 m.m. apart; pores few, large; rays fine; bark thin, smooth, grey, inclined to decorticate, may be useful for half-hard planking and similar work, boxes, &c.
- Chinirana** (5). A dark reddish-brown hardwood, with lighter sapwood of 2-3 c.m. thickness. Pores few, large, resinous; rays numerous, fine. Heartwood very pretty, like dark rosewood, and good for furniture, &c., if of sufficient size without defect; sapwood pinkish; grain rather coarse. Weight about 55 lbs. Specimen 12 c.m. diameter. Bark 6 m.m. thick, cracked and furrowed into squares, dark grey.
- Chipalhasse** (5). A dense hardwood, the heartwood quite black, the small sapwood yellowish, and distinctly defined. Rings about 2 m.m. apart; pores numerous in the sapwood, absent in the heartwood. Surface first-rate, and takes varnish well. Presumably this is one of the ebonies, and it is fit for export if of size and sound. Specimen 12 c.m. diameter. Bark grey, flaky, more or less smooth.

- Chirre** (5). A light-grey or yellowish-grey timber of slow growth, close grain, and taking a good surface. Rings 1-2 m.m. apart; pores numerous, large, showing on the timber surface. Weight about 45 lbs. Bark grey, rather corky, somewhat furrowed.
- Infufo** (5), *Schotia brachypetala*. Heartwood dark-walnut or almost black, but comparatively small on the 10 c.m. sample. Sapwood yellowish-grey, distinctly separated. Pores numerous, rather large, resinous; rays numerous, very fine. Surface very good, and takes varnish well. Bark very thin, smooth or somewhat flaky, light-grey. A good high-class furniture timber.
- Pau-rosa** (2), probably *Rhamnus Zeyheri*. Specimen 15 c.m. diameter. Heartwood red, pretty, and of good surface. Sapwood small, distinct, white; pores few, small; weight about 50 lbs. A beautiful furniture timber, which would be in demand abroad if it can be supplied in quantity and size. Bark grey, made very rough by large wide crusted fissures.
- Another 10 c.m. specimen under the name "Rosa" appears different. It has heartwood brownish-yellow, streaked with dark walnut lines, but comparatively small; sapwood distinct, light-yellow. Pores few, large, irregularly scattered. Rays very fine, rather distinct; surface good; takes varnish well. Sapwood soft; heartwood very hard; weight about 50 lbs. Useful for furniture, &c.
- Tobucho** (5), *Avicennia officinalis*. A prettily dotted grey or yellowish timber of equal and fairly dense consistency. Pores numerous, large, irregularly scattered; rays very fine, also numerous. Bark thin, grey, wrinkled. Old timber is darker in the centre and often damaged. Very abundant on the tidal mud, but the least useful and most persistent of the mangroves, and so occupies space which might be better employed.
- Morintima** (5), *Blighia sapida* or *Bersama mossambicensis*. A yellowish-grey softwood; sapwood rather lighter; pores few, large, scattered, more numerous in the sapwood. Fit for planking, boxes, and other softwood work. Weight about 40 lbs. Bark thin, dark, uncracked, but more or less wrinkled; red inside. One specimen damaged by small borers. Makes a large tree.
- Bacha** (5), *Brachylaena discolor*. A yellowish-grey hardwood of close firm consistence, working to a good surface and taking varnish well. Pores numerous, rather large. Bark grey, corky, deeply fissured longitudinally into ridges 1-2 c.m. wide. A pretty and useful hardwood, seldom but occasionally a large tree.
- Mutsu** (5), probably *Eugenia cordata*. A beautiful yellowish-grey hardwood, prettily-grained on the horizontal cross section. Pores very few; rays very numerous and fine. Surface first-rate, and taking varnish well. Bark very thin, smooth or slightly wrinkled, nearly black. Good furniture timber if large enough.
- Jafilo** (5), probably *Vangueria infausta*. A yellowish hardwood of very slow growth and close dense texture, taking a good surface and showing well under varnish. If large enough would make a good furniture timber. Bark thin, grey, nearly smooth, but with horizontal lines and small warts.
- Mutavan** (5) and **M'tenguene** (5). Each a small sample of a close-grained slow-growing pinkish-yellow timber, taking a good surface. Another small specimen has purplish timber. Useless unless they grow larger.
- Mussalo** (5), *Strychnos spinosa*. A yellowish timber, prettily dotted, and taking a good surface. Pores very numerous and large; weight 35-40 lbs.; softish; fit for boxes and other temporary work.
- Mombe** (5), *Commiphora Harveyi*. A soft grey timber, having numerous large pores. Weight about 35 lbs. Too soft for most purposes except temporary boxes, &c.
- Mussica** (5). A grey timber of medium hardness and fairly rapid growth; rings about 5 m.m. apart. Pores large, and numerous on the rings, small and few elsewhere; rays prominent, numerous; bark thin, nearly white, corky, smooth or wrinkled longitudinally. Specimen too small for technical work.
- Mezdrua** (5). A dense close-grained hardwood, having a small black centre, and taking a good somewhat-grained surface. Bark thin, slightly wrinkled.
- Imbe** (5), *Garcinia Livingstonei*. A yellowish-white timber, weighing about 45 lbs., taking a very good surface, and pretty under varnish. Pores few and small, rays numerous and prominent, and with connecting cross-bars. A good furniture timber when large enough, or for other half-hard purposes. Bark 1-2 c.m. thick, firmly corky or woody, irregularly and deeply fissured and cracked.

## SPECIMENS FROM OTHER OR UNKNOWN SOURCES—

- M'nhucua** (5), from Concession Ferriera-Rollo, M'Chopes. A beautiful yellowish timber, of close equal satiny-grain and good surface, and taking varnish well. Pores close, very fine, long, parallel; rays not evident. Bark grey, rough, thin.



- Nhaio.** (No locality.) Specimen 8 c.m. diameter. A close-grained grey timber of slow growth; fibres fine, close, parallel, giving a fine surface, especially under varnish. Bark very thin, smooth, grey.
- Mebita.** (No locality.) A square log, probably from Quelimane. A yellowish-grey wood, having a small, much darker, heartwood, almost black at the margin. Timber somewhat porous, light; about 45 lbs. The colours in the sample are pretty, and would be useful in fancy furniture work.
- Porope.** From Bazaruto, Ilhe Benguerica. A close grained slow-growing yellowish-grey hardwood, taking a clear good surface. Sample too small for use. Bark whitish-grey; rather thick, corky outside, stringy inside. Said to grow to a large tree round Lourenço Marques.
- Mentogue.** (No locality.) A yellowish-grey dense hardwood, taking a very pretty-grained surface and having a small black centre. Bark smooth, grey, thin. Weight 55 lbs. Fit for furniture work if large enough.
- Mugunya** (10, 16), *Adina microcephala*. From Tete. A yellowish-white timber taking a good and prettily-grained surface, and showing well under varnish. Pores numerous, large, irregular; rays very distinct, rather distant. Weight about 45 lbs. A useful light timber for planking, house-building, boxes, &c. Bark 6 m.m. thick, grey, resinous, slightly cracked.
- Bata.** (No locality.) Too small for technical work. Timber grey, dense, heavy; bark smooth, nearly white.
- Naiope.** (No locality.) Specimen small. A nearly white timber of fairly rapid growth. Bark grey, smooth.
- Vico.** From Jaguia. A poor cracked specimen of a close-grained timber, nearly black in the heartwood and with softer grey sapwood.
- M'bila** (10), *Pterocarpus erinacens*. Dense-brown heartwood, having a small white sapwood. Pores not numerous but rather large and resinous. A first-rate timber, used in Maganja da Costa for house-building and also as poles in the ground, where it is found to be imperishable, and to withstand white ants. Used also in boat-building, wharves, &c., and shipped to coast ports from Bajan and Quelimane for these purposes. Suitable for sleepers, and should supply all the requirements of the Province, but may require to be bored for bolts or spikes. The Administrador's house at Maganja, built between 40 and 50 years ago, is mostly of this timber, and is in good order. It dresses to a good surface, and keeps without paint.

QUALITIES MENTIONED BY MR. P. DUPONT, MR. STEM, AND OTHERS—

- Mohoshle** (15), *Bolusanthus speciosus*. Used almost exclusively for spokes; good also for yokes. A white, hard, very durable timber. Bark very rough; netted ridges grey.
- Mkonko** (15). Good for felloes.
- Mahogany** (1), *Hlafuta* (4), *Afzelia quanzensis*. A reddish timber, used largely by Mr. Dupont, who had fine seasoned 75 c.m. slabs in stock, and showed me beautiful oiled and also polished furniture made of it. In wagon-work he uses it for felloes, cross-bars, beams, &c., indeed for everything except spokes and naves.
- Msonga** (15), Yellow-wood (1), *Podocarpus elongatus*. Useful for planking, quartering, house-building, &c., but not obtainable in large quantity.
- Fongosi** (4, 15), *Kigelia pinnata*. A light and tough white timber, does not split; good for felloes, naves, yokes, &c.
- Goâne** (4), *Albizia fastigiata*. The principal timber for naves, used also for felloes.
- Umbitzan**, or **Umzimbeet** (4), **Bekungu** (15), *Weihea subpeltata*. Very heavy, hard and durable blackish timber, in long straight logs up to 1 metre diameter. Makes clumps of this one kind in the mountain kloofs. Used for poles, furniture, &c.
- Mhlumi** (4). A durable yellowish timber, good for wagon-wood, spokes, felloes, beams, &c.; also for furniture, but too oily for glue to hold fast. Grows to large size.
- Tomboti** (13, 15), *Excoecaria africana*. Beautiful dark heartwood, grained across, and lighter sapwood. Has a strong and permanent smell; is called Sandalwood; and in Kaffraria and Natal is worn as rough scented beads by the Kafir girls.
- Mondo-n-hlovu** (15), *Combretum truncatum*. Very pretty dark-wood, almost like ebony. In large trees 1 metre diameter, almost all heartwood with a small yellowish sapwood. Does not rot, nor be damaged by white ants; so cross-grained it cannot split; splendid for mallets; lasts in water and for poles in the ground. Very hard and heavy. Not much used because so difficult to work, as chisels are damaged by one or two strokes at morticing. Formerly burned into form and used as hoes by the natives before iron hoes were introduced. Present in considerable quantity and as large trees from the Limpopo southward.

**Mkaia, Knopjesdoorn and Aapjesdoorn** (4), *Acacia nigrescens*, *A. Welwitschii*, and *A. rostrata*. Used largely for mining timber after the war; cut out to a considerable extent along the main line. Durable as fence-poles, shoes for buildings, &c., but too hard to work, and very trying on tools. A valuable and heavy dark grey timber, growing gregariously, and occupying large areas as open thorn-veld. Felling is prohibited meantime, but this restriction should be removed as soon as revenue is arranged, by licence or royalty, on timber removed from Government ground.

**Simalahlant** (15), *Nuxia oppositifolia*. Timber reddish-yellow, up to 30 c.m. diameter, seldom sound, not scented; with a dense fibre and prettily streaked, useful for furniture, &c.

**Panda** (4). **Homohomo** (15), *Lonchocarpus laxiflorus*. Timber white, brittle, no use for anything; unsuitable for boxes even, as too hard and often damaged; no use for fuel as it takes twice its weight of other timber to make it burn, and goes out if left alone; if stumped from the ground every root grows again; a bad weed, unfortunately all too common.

**Umtoma** (4). **Iakals besje** (3). Makes good felloes.

**Zelazembe** (4), *Dichrostachys*? A small pink-flowered thorn, with very hard timber; black heart; fit for yokes, &c.

**Kersehout** (3), *Pterocelastrus*. Used for spokes.

**Sneezewood** (1), *Ptaeroxylon utile*. Occurs in Swaziland, but does not occur in the Province so far as I am aware. Mr. Dupont uses crossbars on Sneezewood.

**Mnai** (15). **Red Ivory** (1), *Rhamnus Zeyheri*. Very pretty red timber for furniture.

#### OTHER TIMBERS—

After I left the Province a large collection of timber specimens was discovered in Lourenzo Marques, collected by Government from various distant parts of the Province, and introducing an enormous number of native names which I had not previously met. Mr. O. W. Barrett, Director of Agriculture, has been kind enough to forward notes upon them, which are incorporated elsewhere in so far as they correspond with kinds known to me, but the following long list is of names unknown to me, and being from Mozambique, Tete and Zambesia, probably covers much of the Northern area not traversed by me, while those from Inhambane are probably from the North and West of that town. At Bazaruto, though I collected what was to be found near the port, time did not allow of my ascertaining the native names. Although probably most of the species represented by these names are described in this work, further investigation is necessary to connect the Botanical identification with the native names and notes.

| NAME.                      | WEIGHT.  | HEARTWOOD.               | ALBURNUM.                                                                                              | GRAIN.                      | BARK.             |
|----------------------------|----------|--------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------|-------------------|
| FROM INHAMBANE.            |          |                          |                                                                                                        |                             |                   |
| Chaia and Xaia . . .       | Heavy .  | Mahogany-red . . .       | Buff-yellowish, small . . .                                                                            | Wavy, medium-hard . . .     | Ridged.           |
| Chasua . . . . .           | Medium . | None . . . . .           | Yellowish, with waves and flecks . . .                                                                 | Fine, hard . . . . .        | Very thin.        |
| Thendjêle . . . . .        | Heavy .  | None . . . . .           | Bright yellow . . . . .                                                                                | Fine, satiny . . . . .      | Very thin.        |
| Yarri . . . . .            | Medium . | None . . . . .           | Bright yellow . . . . .                                                                                | Very fine . . . . .         | Thin.             |
| Checalala . . . . .        | Medium . | None . . . . .           | Deep yellow, clouded . . . . .                                                                         | Very fine . . . . .         | Very thin.        |
| Sunga-nambe . . . . .      | Medium . | None . . . . .           | Purplish-buff . . . . .                                                                                | Fine . . . . .              | Very thin.        |
| Nhamafane . . . . .        | Medium . | None . . . . .           | Cream . . . . .                                                                                        | Fine, wavy . . . . .        | Very thin.        |
| Riva . . . . .             | Medium . | Brown-red . . . . .      | Yellowish . . . . .                                                                                    | Medium, flecked . . . . .   | Thin, smooth.     |
| Mudiajofu . . . . .        | Medium . | . . . . .                | Yellowish, with crack-like loose fibre-spaces at intervals, very peculiar, like ingrown bark . . . . . | Fine . . . . .              | Medium.           |
| Nhenheba . . . . .         | Medium . | None . . . . .           | Buff-yellow . . . . .                                                                                  | Fine, satiny . . . . .      | Thin, fibrous.    |
| Muhé (Satinwood) . . . . . | Heavy .  | None . . . . .           | Bright yellow . . . . .                                                                                | Fine, satiny . . . . .      | Medium.           |
| Munhame . . . . .          | Medium . | Brownish, wavy . . . . . | Yellowish . . . . .                                                                                    | Medium, porous . . . . .    | Medium.           |
| Mungatuma . . . . .        | Medium . | None . . . . .           | Purplish, wavy . . . . .                                                                               | Medium, irregular . . . . . | Thick.            |
| Guare . . . . .            | Medium . | Brownish . . . . .       | Brown . . . . .                                                                                        | Medium . . . . .            | Medium, leathery. |

| NAMIB.                                  | WEIGHT.  | HEARTWOOD.                               | ALBURNUM.                                 | GRAIN.                                | BARK.                  |
|-----------------------------------------|----------|------------------------------------------|-------------------------------------------|---------------------------------------|------------------------|
| FROM INHAMBANE— <i>contd.</i>           |          |                                          |                                           |                                       |                        |
| Fava . . . . .                          | Light .  | Mahogany, flecked and clouded . . . . .  | Purplish, very small . . . . .            | Fine, satiny, handsome . . . . .      | Very thin, papery.     |
| Neve (from Cape Natla)                  | Medium . | None . . . . .                           | Purplish-buff . . . . .                   | Fine, flecked . . . . .               | Medium.                |
| Chengue (from Cape Matingane) . . . . . | Heavy .  | Black-brown, wavy . . . . .              | Yellow-buff . . . . .                     | Medium . . . . .                      | Thin, fibrous.         |
| Murramba . . . . .                      | Medium . | . . . . .                                | Yellowish-white . . . . .                 | Medium, satiny . . . . .              | Thin, green.           |
| Chene . . . . .                         | Light .  | None . . . . .                           | Yellowish . . . . .                       | Medium, soft . . . . .                | Medium.                |
| Zimba . . . . .                         | Medium . | Brownish, running into lighter . . . . . | . . . . .                                 | Medium, soft . . . . .                | Thick.                 |
| M'rrambé . . . . .                      | Light .  | None . . . . .                           | Pale purplish . . . . .                   | Flecked, satiny . . . . .             | Thin.                  |
| Cimbire (from Panda) . . . . .          | Heavy .  | Brownish, clouded . . . . .              | Yellowish . . . . .                       | Fine, satiny, handsome . . . . .      | Medium.                |
| Sanute . . . . .                        | Medium . | None . . . . .                           | Yellow, satiny . . . . .                  | Fine, flaky . . . . .                 | Thin, fibrous.         |
| Quenguelle (from Cape Gady) . . . . .   | Medium . | None . . . . .                           | Buff . . . . .                            | Fine . . . . .                        | Very thin, flaky.      |
| Quassu . . . . .                        | Medium . | None . . . . .                           | Yellowish . . . . .                       | Medium . . . . .                      | Medium.                |
| Barahúta . . . . .                      | Light .  | None . . . . .                           | Cream . . . . .                           | Soft . . . . .                        | Thin, leathery, olive. |
| Chirri . . . . .                        | Heavy .  | Mahogany . . . . .                       | Yellow . . . . .                          | Medium . . . . .                      | Medium, coarse.        |
| Muchisso . . . . .                      | Medium . | None . . . . .                           | Yellowish . . . . .                       | Fine . . . . .                        | Very thin.             |
| FROM BAZARUTO.                          |          |                                          |                                           |                                       |                        |
| Mupimbe . . . . .                       | Medium . | None . . . . .                           | Light . . . . .                           | Fine . . . . .                        | Thick.                 |
| Porofa . . . . .                        | Medium . | Olive-yellow . . . . .                   | Yellow, satiny . . . . .                  | Very fine . . . . .                   | Thin, fibrous.         |
| Mutoque . . . . .                       | Medium . | Black . . . . .                          | Brownish . . . . .                        | Fine . . . . .                        | Thin, hard.            |
| Mutunduge . . . . .                     | Medium . | None . . . . .                           | Rose-buff . . . . .                       | Flecked and waved, handsome . . . . . | Thin, leathery.        |
| Muhuó . . . . .                         | Light .  | None . . . . .                           | Pale brownish-yellow . . . . .            | Clouded . . . . .                     | Thin, leathery.        |
| Mucungenuna . . . . .                   | Heavy .  | None . . . . .                           | Purplish . . . . .                        | Fine, flecked . . . . .               | Medium.                |
| Mucua-mumbe . . . . .                   | Heavy .  | None . . . . .                           | Purple-buff, wavy lines . . . . .         | Fine, satiny, handsome . . . . .      | Medium, rough.         |
| Puanhamandembe . . . . .                | Heavy .  | Brown-olive . . . . .                    | Buff-yellow . . . . .                     | Fine . . . . .                        | Medium.                |
| Muriba . . . . .                        | Medium . | None . . . . .                           | Yellowish . . . . .                       | Fine, cloudy . . . . .                | Thin, smooth.          |
| Murita . . . . .                        | Light .  | None . . . . .                           | Olive-yellow . . . . .                    | Fine, with flecks . . . . .           | Thin, fibrous.         |
| Mugorongo . . . . .                     | Heavy .  | Red-brown . . . . .                      | Buff . . . . .                            | Fine, with flecks . . . . .           | Thin.                  |
| Minhabepo . . . . .                     | Heavy .  | None . . . . .                           | Yellow . . . . .                          | Fine, satiny . . . . .                | Thin.                  |
| Monegombera . . . . .                   | Heavy .  | None . . . . .                           | Yellow . . . . .                          | Hard . . . . .                        | Thin.                  |
| Mucurre . . . . .                       | Medium . | Indistinct . . . . .                     | Purplish red-brown . . . . .              | Fine, satiny . . . . .                | Medium.                |
| Muimbirre . . . . .                     | Heavy .  | Purple-red . . . . .                     | Purplish-red . . . . .                    | Fine, hard . . . . .                  | Thick, rough.          |
| Mussite . . . . .                       | Heavy .  | Red-brown with black flecks . . . . .    | Yellow, wavy . . . . .                    | Fine, satiny, hard . . . . .          | Thin.                  |
| Mussarage . . . . .                     | Medium . | None . . . . .                           | Purplish . . . . .                        | Fine . . . . .                        | Thin.                  |
| FROM ZAMBESIA. Locality undefined.      |          |                                          |                                           |                                       |                        |
| Pereze . . . . .                        | Medium . | None . . . . .                           | Buff-yellow, with olive bundles . . . . . | Medium . . . . .                      | Medium, fibrous.       |
| Pagassa . . . . .                       | Medium . | None . . . . .                           | Yellowish . . . . .                       | Coarse, large bundles . . . . .       | Medium.                |
| Luaro . . . . .                         | Heavy .  | Purple-brown . . . . .                   | Yellowish . . . . .                       | Coarse . . . . .                      | —                      |
| Mugumuchena . . . . .                   | Medium . | None . . . . .                           | Bright yellow . . . . .                   | Coarse . . . . .                      | —                      |
| Nhenze . . . . .                        | Medium . | None . . . . .                           | Yellowish-cream . . . . .                 | Satiny . . . . .                      | Thick, rough.          |
| Godone . . . . .                        | Medium . | None . . . . .                           | Olive-yellow . . . . .                    | Fine . . . . .                        | Medium, ridged.        |
| M'fuma . . . . .                        | Medium . | None . . . . .                           | Buff-yellow . . . . .                     | Fine, irregular . . . . .             | Thick, ridged.         |
| Enungo . . . . .                        | Medium . | None . . . . .                           | Bright yellow . . . . .                   | Medium . . . . .                      | —                      |



| NAME.                                            | WEIGHT.                 | HEARTWOOD.                               | ALBURNUM.                           | GRAIN.                    | BARK.            |
|--------------------------------------------------|-------------------------|------------------------------------------|-------------------------------------|---------------------------|------------------|
| FROM ZAMBESIA. Locality und.                     | defined— <i>cont'd.</i> |                                          |                                     |                           |                  |
| Mutosa . . . . .                                 | Light . . . . .         | None . . . . .                           | Buff, with brownish veins . . . . . | Coarse . . . . .          | _____            |
| Mutarara . . . . .                               | Heavy . . . . .         | Brown-purple . . . . .                   | _____                               | Medium . . . . .          | _____            |
| Tanga-tanga . . . . .                            | Light . . . . .         | None . . . . .                           | Yellowish . . . . .                 | Coarse, flecked . . . . . | _____            |
| Cundo-cundo . . . . .                            | Light . . . . .         | None . . . . .                           | Mauve-buff . . . . .                | Coarse . . . . .          | Medium, fibrous. |
| Mucarrare (from Prazo Lugella) . . . . .         | Heavy . . . . .         | Red-purple . . . . .                     | _____                               | Coarse . . . . .          | _____            |
| Muaa . . . . .                                   | Medium . . . . .        | None . . . . .                           | Yellowish, flecked . . . . .        | Medium . . . . .          | _____            |
| M'bana (from Prazo Lugella) . . . . .            | Medium . . . . .        | Purplish, like Black Walnut . . . . .    | Yellowish . . . . .                 | Medium, coarse . . . . .  | _____            |
| Mamutazira . . . . .                             | Heavy . . . . .         | Brown-red . . . . .                      | Yellowish . . . . .                 | Medium, coarse . . . . .  | _____            |
| Magale . . . . .                                 | Medium . . . . .        | Purple-black; clouded . . . . .          | Deep yellow . . . . .               | Fine, wavy . . . . .      | Medium, rough.   |
| Meteme . . . . .                                 | Medium . . . . .        | None . . . . .                           | Buff-yellow . . . . .               | Very coarse . . . . .     | Thin.            |
| Munhuhie (from Massinga) . . . . .               | Medium . . . . .        | None . . . . .                           | Buff, flaky . . . . .               | Fine, wavy . . . . .      | Medium, purple.  |
| Tite . . . . .                                   | Medium . . . . .        | None . . . . .                           | Grey . . . . .                      | Coarse . . . . .          | Thin, rough.     |
| Nhantoniole . . . . .                            | Medium . . . . .        | None . . . . .                           | Grey . . . . .                      | Medium, satiny . . . . .  | Thin.            |
| Vangute . . . . .                                | Light . . . . .         | None . . . . .                           | Grey . . . . .                      | Coarse . . . . .          | Leathery.        |
| Messoio . . . . .                                | Medium . . . . .        | Red-brown . . . . .                      | Grey . . . . .                      | Fine . . . . .            | Thick, ridged.   |
| M'bene . . . . .                                 | Light . . . . .         | None . . . . .                           | Satiny . . . . .                    | Medium . . . . .          | Thin, fibrous.   |
| Dezembe . . . . .                                | Light . . . . .         | None . . . . .                           | Grey . . . . .                      | Coarse . . . . .          | _____            |
| Gerengere . . . . .                              | Medium . . . . .        | Reddish . . . . .                        | Grey . . . . .                      | Coarse . . . . .          | _____            |
| FROM TETE                                        |                         |                                          |                                     |                           |                  |
| Gonono . . . . .                                 | Medium . . . . .        | Indistinct (used for charcoal) . . . . . | Olive-yellow . . . . .              | Medium, satiny . . . . .  | Thick, ridged.   |
| Muzombe . . . . .                                | Medium . . . . .        | None . . . . .                           | Yellow . . . . .                    | Coarse . . . . .          | Thick, ridged.   |
| Mukurungue . . . . .                             | Medium . . . . .        | None . . . . .                           | Satiny . . . . .                    | Very fine . . . . .       | Thin, fibrous.   |
| Kagoro . . . . .                                 | Heavy . . . . .         | Brown-black . . . . .                    | _____                               | Medium . . . . .          | Thin, rough.     |
| Muaa (used for boats, &c.) . . . . .             | Medium . . . . .        | Light-brown . . . . .                    | _____                               | Coarse . . . . .          | _____            |
| Mugingema . . . . .                              | Medium . . . . .        | Red-brown . . . . .                      | _____                               | Medium . . . . .          | Coarse.          |
| Mutsanha . . . . .                               | Medium . . . . .        | Red . . . . .                            | Yellow . . . . .                    | Fine, flaky . . . . .     | Medium, rough.   |
| Mussica, or Tama (a fruit tree) . . . . .        | Medium . . . . .        | None . . . . .                           | Grey . . . . .                      | Medium, wavy . . . . .    | _____            |
| Mucunco . . . . .                                | Medium . . . . .        | Brown-red . . . . .                      | _____                               | Medium, porous . . . . .  | _____            |
| Mtumbue . . . . .                                | Medium . . . . .        | Olive . . . . .                          | _____                               | Medium, lined . . . . .   | Medium, rough.   |
| Mutondo, large tree, used for boats, &c. . . . . | Heavy . . . . .         | Brown or reddish . . . . .               | Small . . . . .                     | _____                     | Medium, rough.   |
| Munonde . . . . .                                | Light . . . . .         | _____                                    | _____                               | Very coarse . . . . .     | Rough.           |
| Mu'nganu-ganga . . . . .                         | Medium . . . . .        | Brown-red . . . . .                      | Reddish . . . . .                   | Coarse . . . . .          | Medium, rough.   |
| Charora . . . . .                                | Light . . . . .         | None . . . . .                           | Yellowish . . . . .                 | Medium, soft . . . . .    | _____            |
| Mugengema (used for construction) . . . . .      | Light . . . . .         | None . . . . .                           | Pale buff . . . . .                 | Medium, soft . . . . .    | _____            |
| Miure . . . . .                                  | Light . . . . .         | None . . . . .                           | Yellow, with dark bundles . . . . . | Medium . . . . .          | Medium, rough.   |
| Muchi . . . . .                                  | Medium . . . . .        | Red, indistinct . . . . .                | Buff-brownish . . . . .             | Medium . . . . .          | Thin.            |
| Capsunga Nyassa (used for charcoal) . . . . .    | Heavy . . . . .         | Dark-brown . . . . .                     | Brownish . . . . .                  | Medium, coarse . . . . .  | Medium.          |

| NAME.                                            | WEIGHT.    | HEARTWOOD.                             | ALBURNUM.                            | GRAIN.                       | BARK.            |
|--------------------------------------------------|------------|----------------------------------------|--------------------------------------|------------------------------|------------------|
| FROM TETE— <i>contd.</i>                         |            |                                        |                                      |                              |                  |
| Minava (used for construction) . . . .           | Medium .   | None . . . . .                         | Yellow . . . . .                     | Coarse, porous . . . .       | Thick.           |
| Muaboi (used for furniture) . . . .              | Medium .   | None . . . . .                         | Buff . . . . .                       | Fine . . . . .               | Medium.          |
| Mucheteco (used for construction) . . . .        | Heavy .    | Red-purple . . . .                     | Buff . . . . .                       | Coarse . . . . .             | Ridged.          |
| Kobo-kobo . . . . .                              | Medium .   | None . . . . .                         | Buff . . . . .                       | Very coarse, porous . .      | Thick.           |
| Mu-kuruti . . . . .                              | Heavy .    | Purple-brown . . . .                   | Yellowish . . . . .                  | Medium . . . . .             | Medium.          |
| Nonde or Munonde, (used for boards, &c.) . . . . | Medium .   | Black, small . . . .                   | Yellow, with black coarse bundles .  | Fine . . . . .               | Very thin.       |
| Mtobué, (used for boards, &c.) . . . .           | Heavy .    | Reddish-purple . . . .                 | Buff . . . . .                       | Coarse . . . . .             | Thin.            |
| Cassacoroé . . . . .                             | Medium .   | None . . . . .                         | Reddish-purple, flecked with yellow  | Fine . . . . .               | Medium, rough.   |
| Mtone . . . . .                                  | Medium .   | None . . . . .                         | Yellowish-white . . . . .            | Fine, satiny . . . . .       | Thick.           |
| Mtowé . . . . .                                  | Very light | None . . . . .                         | Yellowish . . . . .                  | Medium, with large pores .   | Smooth, red.     |
| Mukungani . . . . .                              | Heavy .    | Purple-brown . . . .                   | Yellowish, small . . . . .           | Medium . . . . .             | Thin.            |
| M'sichire (used for furniture, &c.) . . . .      | Heavy .    | None . . . . .                         | Purplish . . . . .                   | Fine, flecked . . . . .      | Medium.          |
| Mussinica (used for charcoal) . . . . .          | Heavy .    | Black, small . . . .                   | Purplish . . . . .                   | Coarse . . . . .             | Medium.          |
| Gobobo (medicinal) . . . . .                     | Medium .   | Purplish . . . . .                     | Buff . . . . .                       | Medium, satiny . . . . .     | Medium, rough.   |
| Mu kno kuo (charcoal) . . . . .                  | Heavy .    | Indistinct . . . . .                   | Purplish-yellow . . . . .            | Fine . . . . .               | Medium.          |
| Muquia or Mucú . . . . .                         | Light .    | Indistinct . . . . .                   | Purplish-yellow, with dark waves .   | Medium . . . . .             | Medium.          |
| Matacha . . . . .                                | Medium .   | Red-purple with black flecks . . . . . | Reddish . . . . .                    | Fine . . . . .               | Thick, ridged.   |
| Chaumbo . . . . .                                | Medium .   | Indistinct purple waves . . . . .      | Reddish . . . . .                    | Fine, flaky . . . . .        | Medium.          |
| Kadibassa . . . . .                              | Heavy .    | Brown-red . . . . .                    | Mauve-cream . . . . .                | Medium . . . . .             | Medium, rough.   |
| Mtendza . . . . .                                | Medium .   | Olive-brown . . . . .                  | Buff-yellow, flecked . . . . .       | Coarse . . . . .             | Medium, fibrous. |
| Nhacosondze or Nhacassanga . . . . .             | Medium .   | None . . . . .                         | Yellowish . . . . .                  | Fine, satiny, irregular . .  | Medium.          |
| Kakata . . . . .                                 | Medium .   | None . . . . .                         | Yellowish . . . . .                  | Fine . . . . .               | Medium.          |
| Mutacha . . . . .                                | Medium .   | Brown . . . . .                        | Yellowish . . . . .                  | Fine . . . . .               | Thin.            |
| Cadzive . . . . .                                | Heavy .    | Black . . . . .                        | Buff . . . . .                       | Medium, wavy . . . . .       | Thin.            |
| Nhafinfia . . . . .                              | Light .    | Indistinct . . . . .                   | Buff . . . . .                       | Coarse . . . . .             | Medium, grey.    |
| FROM MOZAMBIQUE.                                 |            |                                        |                                      |                              |                  |
| Iodo . . . . .                                   | Medium .   | None . . . . .                         | Brownish-buff . . . . .              | Medium . . . . .             | Leathery.        |
| Mapige . . . . .                                 | Medium .   | None . . . . .                         | Yellow, with purple bundles . . . .  | Medium . . . . .             | Medium.          |
| Cócoróque . . . . .                              | Medium .   | (Hollow) . . . . .                     | Yellow, dark . . . . .               | Fine, satiny, hard . . . .   | Very thin.       |
| Mlorga . . . . .                                 | Medium .   | None . . . . .                         | Olive yellow . . . . .               | Coarse, with large bundles . | Medium.          |
| Mutolo . . . . .                                 | Medium .   | Red-purple . . . . .                   | Mauve-buff . . . . .                 | Medium . . . . .             | Medium.          |
| Nipuére . . . . .                                | Light .    | None . . . . .                         | Yellow, with dark bundles . . . .    | Medium . . . . .             | Thin, fibrous.   |
| Feza . . . . .                                   | Medium .   | Purplish brown . . . .                 | Buff . . . . .                       | Medium . . . . .             | —                |
| Melipalipa . . . . .                             | Heavy .    | None . . . . .                         | Dull yellow, with waves . . . . .    | Fine, satiny, handsome . .   | Medium.          |
| Marribo . . . . .                                | Light .    | None . . . . .                         | Yellow-buff . . . . .                | Coarse . . . . .             | Thick.           |
| Macu . . . . .                                   | Medium .   | None . . . . .                         | Yellow-buff . . . . .                | Coarse, porous . . . . .     | Thick, smooth.   |
| Bebéda . . . . .                                 | Medium .   | Indistinct, purplish-red . . . . .     | Yellow . . . . .                     | Fine, flecked . . . . .      | Thin, whitish.   |
| Mceto . . . . .                                  | Medium .   | None . . . . .                         | Purplish-buff, flecked and clouded . | Medium . . . . .             | Thin.            |

| NAME.                          | WEIGHT.    | HEARTWOOD.                                         | ALBURNUM.                                                           | GRAIN.                               | BARK.                                                                        |
|--------------------------------|------------|----------------------------------------------------|---------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------|
| FROM MOZAMBIQUE— <i>contd.</i> |            |                                                    |                                                                     |                                      |                                                                              |
| Rali . . . . .                 | Very light | None . . . . .                                     | Cream-buff . . . . .                                                | Very coarse . . . . .                | Thin, composed of layers of lace like <i>Lagetta linearia</i> of West Indies |
| Umpepo . . . . .               | Medium .   | None, large pith . . . . .                         | Buff . . . . .                                                      | Coarse . . . . .                     | Thick.                                                                       |
| Tandavana . . . . .            | Medium .   | None . . . . .                                     | Buff . . . . .                                                      | Medium, satiny . . . . .             | Very thin, fibrous.                                                          |
| Mielamache . . . . .           | Medium .   | None . . . . .                                     | Buff-yellow . . . . .                                               | Fine, pasty . . . . .                | Thin.                                                                        |
| Ucopandiro . . . . .           | Medium .   | Indistinct . . . . .                               | Purplish, with black streaks and flecks, handsome, unique . . . . . | Fine, wavy, hard . . . . .           | Thick.                                                                       |
| Petepeto . . . . .             | Medium .   | None . . . . .                                     | Bright-yellow . . . . .                                             | Fine, flecked . . . . .              | Medium, fibrous.                                                             |
| Mohocere . . . . .             | Heavy .    | Deep-red, flecked black, handsome . . . . .        | Buff-yellow . . . . .                                               | Fine, satiny . . . . .               | Thick, ridged; white-grey.                                                   |
| Messirro . . . . .             | Medium .   | None . . . . .                                     | Yellow . . . . .                                                    | Pasty . . . . .                      | Medium, white; fibrous.                                                      |
| Matti . . . . .                | Heavy .    | None . . . . .                                     | Yellow . . . . .                                                    | Satiny, hard . . . . .               | Medium.                                                                      |
| Narmarrete . . . . .           | Very heavy | Brownish, streaked . . . . .                       | Yellow, small . . . . .                                             | Irregular . . . . .                  | Thin, fibrous.                                                               |
| Nacuba . . . . .               | Medium .   | Red-brown with black pores . . . . .               | Yellow . . . . .                                                    | Satiny . . . . .                     | Thin, fibrous.                                                               |
| Huiquinique . . . . .          | Heavy .    | Red-brown with black pores . . . . .               | Yellow, small . . . . .                                             | Fine . . . . .                       | Thin, fibrous.                                                               |
| Mucarranhaxa . . . . .         | Heavy .    | Brownish . . . . .                                 | Yellowish . . . . .                                                 | Banded, satiny . . . . .             | Thin, fibrous.                                                               |
| Inhamula . . . . .             | Medium .   | Brownish . . . . .                                 | Brown . . . . .                                                     | Medium . . . . .                     | Medium, rough.                                                               |
| Arriparripa . . . . .          | Light .    | Red-brown with coarse pores . . . . .              | Yellowish . . . . .                                                 | Medium . . . . .                     | Thick.                                                                       |
| Ginama . . . . .               | Medium .   | Flecked yellowish and red-brown (merged) . . . . . | Yellowish . . . . .                                                 | Irregular . . . . .                  | Medium.                                                                      |
| Murreperrepe . . . . .         | Medium .   | Pale-brown . . . . .                               | Buff . . . . .                                                      | Irregular . . . . .                  | Very thin, fibrous.                                                          |
| Cagolla . . . . .              | Heavy .    | None . . . . .                                     | Yellow . . . . .                                                    | Fine, hard . . . . .                 | Thick, rough.                                                                |
| Metaurahata . . . . .          | Light .    | Black, small . . . . .                             | Buff-yellow . . . . .                                               | Satiny . . . . .                     | Thin.                                                                        |
| Cinja . . . . .                | Medium .   | None . . . . .                                     | Cream, with peculiar fibrous spaces like <i>Mudiajofu</i> . . . . . | Pasty . . . . .                      | Thin.                                                                        |
| Maporre . . . . .              | Medium .   | None . . . . .                                     | Yellowish . . . . .                                                 | Fine, satiny . . . . .               | Thin.                                                                        |
| Muchigy . . . . .              | Heavy .    | None . . . . .                                     | Reddish, flecked darker; splits . . . . .                           | Medium, irregular . . . . .          | Thick.                                                                       |
| Otago . . . . .                | Medium .   | None . . . . .                                     | Yellowish . . . . .                                                 | Medium . . . . .                     | Medium.                                                                      |
| Vate . . . . .                 | Medium .   | Brown, with black margin . . . . .                 | Yellowish . . . . .                                                 | Coarse . . . . .                     | Thick.                                                                       |
| Mcaji . . . . .                | Light .    | Red . . . . .                                      | Yellowish . . . . .                                                 | Medium, flecked . . . . .            | Very thin; papery.                                                           |
| Nanouna . . . . .              | Heavy .    | None . . . . .                                     | Yellow . . . . .                                                    | Medium, hard . . . . .               | Thin, papery.                                                                |
| Palomoto . . . . .             | Medium .   | None . . . . .                                     | Olive-yellow . . . . .                                              | Fine, large bundles . . . . .        | Thin.                                                                        |
| Milia-palomoto . . . . .       | Heavy .    | None . . . . .                                     | Deep yellow . . . . .                                               | Coarse, satiny . . . . .             | Medium, fibrous.                                                             |
| Arrête . . . . .               | Heavy .    | Brown . . . . .                                    | Yellow, large pores . . . . .                                       | Medium . . . . .                     | Medium.                                                                      |
| M'eixe . . . . .               | Heavy .    | Olive . . . . .                                    | Olive-yellow . . . . .                                              | Fine, satiny . . . . .               | Thick.                                                                       |
| M'lanie . . . . .              | Heavy .    | None . . . . .                                     | Buff, with large white bundles . . . . .                            | Coarse . . . . .                     | Medium.                                                                      |
| Munococo . . . . .             | Medium .   | None . . . . .                                     | Olive-buff . . . . .                                                | Medium, flecked . . . . .            | Thick.                                                                       |
| Auade (Satin-wood) . . . . .   | Medium .   | None . . . . .                                     | Bright buff-yellow . . . . .                                        | Fine, banded . . . . .               | Thin.                                                                        |
| Uncuole . . . . .              | Light .    | Black, small . . . . .                             | Mauve-buff, with large black bundles . . . . .                      | Medium . . . . .                     | Medium.                                                                      |
| Movere . . . . .               | Medium .   | Brownish-purple . . . . .                          | Yellowish, small . . . . .                                          | Medium, dotted and flecked . . . . . | Medium, leathery.                                                            |
| Merréba . . . . .              | Heavy .    | Brown-black . . . . .                              | Buff-yellow . . . . .                                               | Coarse . . . . .                     | Thick, ridged.                                                               |
| Chemase . . . . .              | Heavy .    | Red-brown . . . . .                                | Purplish-buff . . . . .                                             | Medium . . . . .                     | Medium.                                                                      |
| M'parra-parra . . . . .        | Medium .   | Pale-brown . . . . .                               | Buff-yellow . . . . .                                               | Fine . . . . .                       | Thick.                                                                       |
| M'rolló . . . . .              | Light .    | None . . . . .                                     | Buff-yellow, with flecks . . . . .                                  | Medium . . . . .                     | Thin.                                                                        |
| Melonge . . . . .              | Medium .   | None . . . . .                                     | Bright Olive-yellow . . . . .                                       | Fine, satiny . . . . .               | Thin, fibrous.                                                               |



| NAME.                               | WEIGHT.    | HEARTWOOD.                      | ALBURNUM.               | GRAIN.                 | BARK.                     |
|-------------------------------------|------------|---------------------------------|-------------------------|------------------------|---------------------------|
| FROM MOZAMBIQUE— <i>contd.</i>      |            |                                 |                         |                        |                           |
| Cagico                              | Light      | None                            | Buff                    | Fine                   | Thin.                     |
| M'sichiri (used for furniture, &c.) | Heavy      | None                            | Purplish                | Fine, flecked          | Medium.                   |
| Chemuite                            | Light      | Red                             | Yellowish               | Fine, soft             | —                         |
| M'culoe                             | Medium     | None                            | Olive-yellow            | Fine                   | Medium.                   |
| Melope                              | Medium     | Red-brown                       | Reddish-buff            | Fine                   | Thin.                     |
| Tocute                              | Medium     |                                 | Buff-yellow             | Fine, hard             | Medium.                   |
| Ahioi                               | Heavy      | None                            | Buff-yellow             | Satiny                 | Medium, ridged.           |
| M'repa                              | Heavy      | None                            | Buff, cloudy            | Fine, satiny           | Thin.                     |
| Ma'lague                            | Medium     | Red-purple                      | Yellowish               | Coarse, porous         | Thin, fibrous.            |
| Lape or Lope                        | Heavy      | Reddish, irregular.             | Pale-mauve              | Fine, cloudy           | Very thin.                |
| Dugo-dugo                           | Light      |                                 | Yellow                  | Pasty, hard            | Medium, rough.            |
| Maiago                              | Medium     | None                            | Buff                    | Fine                   | Thin.                     |
| Naxipalala                          | Heavy      | None                            | Buff-yellow             | Fine, satiny           | Thin.                     |
| Mauaia                              | Medium     | None                            | Deep-yellow             | Medium, flecked        | Medium, rough.            |
| M'edcau                             | Medium     | None                            | Deep-yellow             | Fine, satiny           | Medium, rough.            |
| Mulacama                            | Heavy      |                                 | Brown                   | Fine, flaky, beautiful | Medium.                   |
| M'reto                              | Medium     | Pale-buff                       | Yellow                  | Medium, flecked        | —                         |
| M'jaba                              | Medium     | Red-brown                       | Buff-yellow             | Fine, banded           | Thin, fibrous.            |
| Nacuna (Satinwood)                  | Heavy      | None                            | Yellow, satiny          | Fine, flaky, banded    | Very thin.                |
| Tricule                             | Medium     | None                            | Creamy, pasty           | Very fine, invisible   | Very thin, flaky.         |
| Biri or Pirre                       | Medium     | Dark-brown                      | Yellow, very small      | Coarse, pores large    | Thick, tough, smooth.     |
| Mouco                               | Light      |                                 | Yellowish               | Coarse                 | Medium, rough.            |
| Tandavarra                          | Medium     | None                            | Yellowish               | Fine, satiny           | Thin, fibrous.            |
| M'guata                             | Medium     | Brown-red                       | Dark, small             | Medium                 | Decorticating.            |
| Nabiro                              | Heavy      | Pale-brown, small               | Yellowish               | Fine                   | Very thin, grey, fibrous. |
| Mouculuco                           | Medium     | None                            | Yellowish               | Fine                   | Thick, smooth.            |
| Tenderia                            | Heavy      | Purple, small                   | Yellowish               | Pasty                  | Thin, hard.               |
| Metarronata                         | Heavy      | None                            | Reddish-buff            | Fine, cloudy           | Medium.                   |
| Murreia-rreia                       | Medium     | None                            | Buff, with white fibres | Coarse                 | Thin.                     |
| Murreia-rreia                       |            | Another specimen bright yellow. |                         |                        |                           |
| Nacuzenzer                          | Medium     | None                            | Buff                    | Fine                   | Medium, flaky.            |
| N'butua                             | Heavy      |                                 | Buff-yellow             | Medium                 | Thick, ridged.            |
| Dade                                | Heavy      | Mahogany                        | Buff-yellow             | Medium                 | Medium, rough.            |
| Repa                                | Medium     |                                 | Buff                    | Medium                 | Medium.                   |
| Am'loe                              | Medium     |                                 | Cream                   | Coarse                 | Thin, leathery.           |
| Pau-Preto (2), Ebony                | Heavy      | Black                           | Yellow                  | Fine                   | Thin.                     |
| Riga-riga                           | Medium     | Brown                           | Yellow                  | Medium, satiny         | Medium, whitish.          |
| Mangal randatu (2)                  | Medium     | Indistinct                      | Brownish-yellow         | Medium, satiny         | —                         |
| Macu (from Matibane)                | Medium     |                                 | Brownish-yellow         | Pores large, dark      | Medium, ridged.           |
| Macu (from M'cubury)                | Light      |                                 | Yellowish               | Satiny, fine           | Medium, smoothish.        |
| Muntabajo                           | Heavy      |                                 | Yellowish-fulvous       | Satiny, fine           | Medium, rough.            |
| Murrocôco                           | Medium     | Indistinct                      | Yellow, satiny          | Medium, rayed          | Thick, leathery.          |
| M'tetle                             | Light      | None                            |                         | Coarse                 | Thick, fibrous, green.    |
| Mucujanai                           | Medium     | None                            | Satiny                  | Very fine              | Thick, creamy.            |
| Mica or Memba (= Ebony)             | Very heavy | Black                           |                         | Fine                   | Very thin.                |

# The Timbers.

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| NAME.                          | WEIGHT.    | HEARTWOOD.             | ALBURNUM.            | GRAIN.                    | BARK.                 |
|--------------------------------|------------|------------------------|----------------------|---------------------------|-----------------------|
| FROM MOZAMBIQUE— <i>contd.</i> |            |                        |                      |                           |                       |
| Mucuva . . . .                 | Medium .   | Brown-red . . . .      | . . . . .            | Fine . . . . .            | Leathery, thin.       |
| M'pácala . . . .               | Medium .   | Brown-red . . . .      | . . . . .            | Flaky . . . . .           | Thick.                |
| Candala . . . .                | Very heavy | None . . . . .         | . . . . .            | Fine, wavy flakes . . . . | Thick, rough.         |
| Macixe . . . .                 | Medium .   | None . . . . .         | Red-brown . . . . .  | Fine . . . . .            | Very thin, trunk much |
|                                |            |                        | Grey . . . . .       |                           | ridged.               |
| Currai . . . .                 | Medium .   | Black, small . . . .   | . . . . .            | Very fine . . . . .       | Granular.             |
| Mielamache . . . .             | Medium .   | Brown-red . . . .      | . . . . .            | Very fine . . . . .       |                       |
| Nailac . . . .                 | Medium .   | . . . . .              | Buff-brown . . . . . | Fine . . . . .            |                       |
| Meleva . . . .                 | Medium .   | . . . . .              | Satinwood . . . . .  | Fine, satiny . . . . .    | Thin, fibrous.        |
| Roto . . . .                   | Light . .  | . . . . .              | . . . . .            | Coarse, porous . . . . .  |                       |
| Canhubo . . . .                | Light . .  | Reddish, small . . . . | . . . . .            | Medium, flaky . . . . .   | Medium, rough.        |

Enormous as is the list of timbers contained in this chapter, I feel that it only touches the fringe of the subject, and that many kinds, probably including some of the most important, are not mentioned. The whole question of timber utilization, however, hinges less on the number of valuable kinds than on the quantity of a few of the most valuable, which can be brought into market in bulk and command attention, the balance having to go as mixed hardwoods or mixed softwoods in accordance with their nature, but as such fetching only the usual price of mixed material. Beautiful furniture timbers, especially beautiful red and dark walnut furniture timbers, abound, and unfortunately in the log-collections the finest of these, of large size, were unnamed, and so probably have escaped mention. The number of durable and large or fairly large timbers fit for railway sleepers is very considerable; while the number and wide distribution of soft plank-timbers renders the importation of house-building material unnecessary for any district served by the ports of the Province. The only trouble is that they do not grow ready seasoned, planed and tongued, as are the imported timbers on arrival. Poles and props of various hardwoods suitable for Transvaal and Rhodesian requirements exist in vast abundance, and the matter of collection and consignment is well worth the attention of contractors and financiers. These subjects will be further dealt with in Chapter VI.

## CHAPTER V.

### Miscellaneous Economic Products.

#### I.—RUBBER.

RUBBER is procurable in every district of the Province, but its extraction has not received the same attention here that it has in some other parts of Africa. This is not due to small quantity or low grade; rather is it due to the natives being so prosperous and having so little use for money that they do not require, in order to live, even to collect what surrounds them on every hand. In the districts south of the Tropic, the rubber, so far as known, is almost entirely the product of *Landolphia Kirkii*, a scandent shrub or a rampant climber in accordance with its surroundings, though as several other species of *Landolphia* occur, it is quite probable that some of them yield a quota. Many other trees, shrubs and creepers yield latex, but none of them are being collected on a commercial scale meantime.

From 22° S. to the Zambesi the administration is in the hands of the *Companhia de Mozambique*, whose Director of Agriculture, Mr. W. H. Johnson, F.L.S., published last year a valuable treatise on the rubber industry there,<sup>1</sup> from which it appears that that same species is the one well-known source of rubber there; while north of the Zambesi *Landolphia Kirkii* and *Mascarenhasia elastica* yield about an equal proportion each, and the rubber of each is collected in the same way and accepted at the same value by the traders.

Mr. Johnson states that the quantity of rubber exported from his territory, since records are available, has been:—

|      |   |   |               |                        |   |   |                |
|------|---|---|---------------|------------------------|---|---|----------------|
| 1894 | - | - | 43,858·7 lbs. | 1902                   | - | - | 134,813·8 lbs. |
| 1895 | - | - | 27,812·4 "    | 1903                   | - | - | 133,988·8 "    |
| 1896 | - | - | 60,577·0 "    | 1904                   | - | - | 199,126·4 "    |
| 1897 | - | - | 21,676·6 "    | 1905                   | - | - | 214,500·0 "    |
| 1898 | - | - | 48,661·8 "    | 1906                   | - | - | 186,135·0 "    |
| 1899 | - | - | 148,570·4 "   | 1907                   | - | - | 95,020·0 "     |
| 1900 | - | - | 82,141·4 "    | 1908 (January to June) | - | - | 68,200·0 "     |
| 1901 | - | - | 182,516·4 "   |                        |   |   |                |

Total 1,647,598·7 lbs. or say 735 tons.

worth at 4s. per lb. (its average value in London) £329,520, or nearly an average of £23,000 per annum.

The exports declared from Government territory in the Province of Mozambique have been:—

| YEAR. | KILOS OF RUBBER. | VALUE IN REIS. |
|-------|------------------|----------------|
| 1904  | 298·008          | 318·292        |
| 1905  | 361·803          | 277·119        |
| 1906  | 438·371          | 334·003        |
| 1907  | 308·205          | 264·498        |

Regulations have been gazetted from time to time, but meantime throughout Government territory there are practically no regulations enforced in regard to rubber; concessionaires or companies follow whatever means they prefer in regard to its collection and transmission, but with these, as in unoccupied lands it is almost invariably the case that the native is paid by weight for what he collects, either by the landowner or by Indian traders (Banyans) who are supposed to pay store license to the owner or to Government. The value of this license varies with the district, &c., and these Banyans seem to be experts at evading taxation.

Concerning this matter in the *Companhia de Mozambique's* territory, Mr. Johnson states:—"The Mozambique Company does not monopolise the collection of rubber, but allocates the rubber forests, in certain districts, to private enterprise, and reserves others for its own exploitation. To avoid the destruction of plants by over-tapping, rubber

<sup>1</sup> "The Rubber Industry in the Territories of Manica and Sofala," Whitehead, Morris & Co., London, price 1/-



collection is prohibited in certain regions when it is considered that the plants therein require a period of rest for recuperation. The conservation of rubber-yielding plants is still further provided for by restricting the period of collection and trading of rubber from the 15th February to the 31st August of each year. Persons desirous of collecting or trading rubber in any of the districts open to the public must provide themselves with a license costing £12, which is un-transferable, and only available for a year in the district indicated thereon. Each kilo of rubber, obtained by virtue of this license, is subject to a tax of 250 reis per kilo (6d. per lb.) An export tax of 8 per cent. *ad valorem* is also charged on such rubber. A license-holder is compelled to keep a daily record of the amount of rubber obtained, and to send a monthly statement showing the total amount received during each month, to the Commandant of the district in which he is conducting his operations."

In the territory administered by the Companhia do Nyassa (about from 10°50' S. to 14° S.) the extraction of root rubber from the same species is said to have been practised, and endeavours are being made to stop this destructive process.

*Landolphia Kirkii* extends north, south and west of the Province; within the Province it is ubiquitous, though less abundant perhaps on the stiff mud-flats which form thorn-veld; it enjoys light sandy soil; it likes fair rainfall, and to be of economic use must have trees or bushes on which to hang. On this point Mr. Johnson states:—"This plant is practically ubiquitous in these Territories. The writer has observed it growing within a few yards of the seashore and at all elevations up to 4000 feet. Its habit is however profoundly altered by the different climatic and other conditions obtained in these various districts. In the dry areas of the low country it assumes a low growing, straggly, and at times almost shrubby habit; the leaves, flowers and fruit which it produces in these regions being much smaller than those of plants growing at higher elevations. In the latter districts *Landolphia Kirkii* develops into an enormous vine, with tappable stems often more than a hundred feet in length, its foliage being displayed in the sunlight, intermingled with that of gigantic forest trees. The stems of such vines frequently attain a diameter of 10 to 12 inches, whereas those of plants growing in the low country rarely exceed a diameter of 6 inches." It would be impossible and even misleading to try to estimate the number of vines per acre in any district; often it is present in large quantity, but with its vegetation so high that it is not observed, only monkey-ropes similar to other monkey-ropes, except to the trained collector, connecting it with the ground. In other cases, as at Polana, Lourenço Marques, it is a most abundant shrubby straggler, and still has no stem to tap. To be an economic success it requires as support trees of considerable height, thus showing long bare "ropes," which can be tapped for a considerable distance. The native method of slashing off a piece of bark of any size and to any depth, does not commend itself to the economist as the best method of taking full advantage of what stems are handled; still, as this work is done by some of the lowest types of humanity, advanced methods must enter slowly. Throughout my tour I did not find a case of destructive tapping, though probably in many cases more latex would have been obtained by different treatment. That, however, is the natives' look-out; he obtains a recognised price and it is for him to devise means of increasing the yield in a given time and thereby raising his pay. And, so far as present tapping is concerned, an enormous quantity of rubber is not being touched. In every district there is scope for development in the rubber production; and it appears to me that the Government should encourage in every way, such as easy licenses, tapping concessions, &c., &c., the collection of latex, and then charge a royalty (or export duty) of say sixpence per pound on it at the port of first shipment. If development syndicates or companies were encouraged instead of the Banyan trader, I think the Government revenue would be enormously increased in this manner; but even in Banyan hands it is surprising that more is not done than is now. The underlying difficulty is that men go to Johannesburg for work from the most remote parts of the Province, and on return bring with them, what to them and their relations, is such a store of cash, that the need to work locally does not exist, and the return for local work appears insignificant compared with the Transvaal wage. This affects local labour of every kind; even mealie and pea-nut production and export has decreased since the Transvaal labour market opened, and to my mind the Transvaal labour demand, despite its cash return, is a curse rather than a benefit to this Province.

In the districts where hut-tax or poll-tax is sometimes difficult to collect, I think payment in rubber should be accepted instead of cash; indeed I would favour Government purchase of rubber at every Commandant's or Administratador's station or sub-station, at a tariff rate, however low, thereby avoiding the trickery and demoralisation which, I fear, too often accompanies the Banyan.

The fear sometimes expressed (often by interested parties) that *Landolphia* rubber is being destructively worked and rapidly exhausted in this Province, was not borne out by anything I saw, and on this subject Mr. Johnson remarks:—"The difficulties attending the supervision of the collection of wild rubber from vines scattered about in the dense forest or amongst thorn bushes can only be fully appreciated by those personally acquainted with the conditions under which these plants grow. The native collector is as much an adept in evading the thorns as the eyes of his overseer, and he passes with facility through the mass of dense, tangled, thorn-laden vegetation which is quite impenetrable by a white man. When we consider that the collection of rubber in Manica and Sofala has been in progress for nearly 30 years, and the exports of rubber to-day are considerably greater than those of 14 years ago (the earliest date from which records are available), we are compelled to doubt whether the extermination of the sources of wild rubber is as imminent as the promoters of plantation rubber companies would have us believe."

The usual method of collection of *Landolphia* rubber is to slash off part of the bark, allow the latex to partly coagulate on the surface, and then draw it off in threads by rolling these on to a grass or twig core, so as to form a ball 2 inches diameter or thereby. The latex is thick and coagulates quickly on exposure, but if it is flowing so freely

as to drop off then the collector wets his thumb in his mouth, passes it over the wound, collecting on it all the latex available at the moment, and immediately smears this on his forearm or chest, or elsewhere on his body, one who is climbing and collecting sometimes coming to the ground covered all over with coagulated latex ready to roll off. The milk is white at first but changes to amber-colour as it dries; as it is never collected in vessels there is little opportunity for sticks or dirt being included, but as Mr. Johnson says, "The wily native at one time adulterated his rubber by winding it around pieces of stone, lead, dirt, &c., but this practice is now abolished, as small balls or spindles are demanded which are cut open on receipt. This process likewise expedites the drying of the rubber, which is at present effected in open sheds without the aid of artificial heat. The rubber is packed for export in sacks which contain about 110 pounds." He further states:—"It possesses excellent physical properties, and the following analysis, made of fair samples at the Imperial Institute, London, demonstrates both its high caoutchouc content and freedom from deleterious impurities:—

|                    | SAMPLE AS RECEIVED.<br>PER CENT. | COMPOSITION OF<br>DRY RUBBER.<br>PER CENT. |
|--------------------|----------------------------------|--------------------------------------------|
| Moisture . . . .   | 5'0                              | —                                          |
| Caoutchouc . . . . | 85'6                             | 90'1                                       |
| Resin . . . .      | 5'5                              | 5'7                                        |
| Proteids . . . .   | 1'3                              | 1'3                                        |
| Insoluble . . . .  | 2'7                              | 2'8                                        |
| Ash . . . .        | 0'46                             | 0'48                                       |

The rubber, when properly prepared is always in good demand, and realises prices only slightly inferior to 'Fine Para' . . . ."

The above analysis is supported by the following, prepared by the Director of the Imperial Institute on two samples submitted by me in 1904, prepared from Landolphia vines in Natal Maputa, just across the boundary of this Province.

|                               | As received.<br>Per Cent. | Calculated for<br>Dry Material.<br>Per Cent. | As received.<br>Per Cent. | Calculated for<br>Dry Material.<br>Per Cent. |
|-------------------------------|---------------------------|----------------------------------------------|---------------------------|----------------------------------------------|
| Moisture . . . .              | 7'7                       | —                                            | 9'1                       | —                                            |
| Caoutchouc . . . .            | 80'1                      | 86'8                                         | 75'7                      | 83'3                                         |
| Resin . . . .                 | 6'9                       | 7'5                                          | 10'3                      | 11'3                                         |
| Dirt . . . .                  | 5'3                       | 5'7                                          | 4'9                       | 5'4                                          |
| Ash, included in Dirt . . . . | 0'31                      | 0'33                                         | 0'37                      | 0'40                                         |

Professor Dunstan remarks:—"Both had evidently been carefully prepared, and their physical characters were exceedingly good. In composition they compare very favourably with other samples of rubber derived from Landolphia Kirkii which have recently been examined in the Scientific and Technical Department of the Imperial Institute. The rubbers were submitted for valuation to brokers, who report that consignments represented by those specimens would command a very ready sale, and would probably realise as much as 4s. per lb. in the London market at the present time."

Mr. Johnson touches another important point as follows:—"Experiments have been conducted by the writer with the view of improving the quality and keeping properties of the rubber by exposing it to the smoke given off fires fed with wood. Samples of rubber prepared in this manner and similar ones taken from the same collection, but dried by the ordinary method, were submitted for valuation to London rubber brokers. The smoked samples were rated at 4s. to 4s. 1d. per lb., and the unsmoked samples at 3s. 11d. to 4s. per lb., when 'Fine Para' was selling at 4s. 2d. per lb. In their report upon this subject the brokers state that the smoked samples were slightly improved both in quality and appearance by the process, as it gave them a brighter look and appeared to increase their elasticity. There is always an abundance of wood-fuel available in the rubber districts, and, as the period of drying is considerably curtailed when the smoking method is adopted, it is considered that it might be generally employed with advantage."

At the present time the first consideration is the utilization of the enormous store of rubber contained in the indigenous forests in a wild condition, but considering the scattered nature of the work and the impossibility under present conditions of supervising that work, it appears to me that money now being spent in the introduction and culture of exotic rubber trees in localities often unsuited to them, would be better employed in increasing the stock of Ibungu (*Landolphia Kirkii*) in the forests and giving it such encouragement and culture as may be necessary for its best development. I have not yet seen an acre of it which could not have carried many times the stock it had, and evidently in this as in practically every other crop, one acre fully stocked is more economically reaped than 20 acres of scattered wild growth. Writing some years ago on this plant in connection with the rubber-forests of Natal Maputa I said, "Tree-planting in Natal," P. Davis & Sons, Maritzburg, "as a natural product there may be a considerable, though as yet ill-defined, value attached to the rubber-fields of Maputaland, but there can be no doubt that extensive culture alone can give this plant the commercial value which evidently it is intended to bear. The culture has all to be learned as yet, for though the same species extends north along east and west Central Africa, and yields an enormous value of rubber there from wild plants, its culture has nowhere been taken up. How many years it will take to grow to latex-bearing size, what is the best age and size for tapping, what are the best methods of propagation and of training, and many other interesting questions, have all to be worked out by patient experiment. But meantime all that can be said is that it seeds freely, that the seeds are short-lived, that seedlings transplant without difficulty when well cut back, and that rather dry sandy ridges are its favourite home." And that is the position to-day. The vine fruits freely, the fruit is edible to man and beast, the seeds pass through birds in a fit condition for germination and are distributed to some extent in this manner. Mr. Johnson says, "The Mozambique Company have expended considerable sums of money with the object of increasing the stock of plants in its own reserves. Many thousands of seed and young plants have been planted, and efforts have been made to assist the natural methods of propagation in the forest by layering the vines." Elsewhere he states, "In thick forest however comparatively few of the plants appear to develop beyond the seedling stage owing probably to the absence of sufficient light." If that be the cause, in localities where timber has practically no value at present, more light is obtainable at low cost by ringing a fair proportion of the trees.

As has already been mentioned, about half of the rubber from Maganja da Costa and Nhamacurra is obtained from *Mascarenhasia elastica*, a tree common there along the running streams, but never found away from living water. The tree bleeds more slowly than *Landolphia Kirkii*, and the latex is less dense; it however coagulates freely on exposure smeared on the body of the collector. Mr. Johnson states:—"The resultant rubber, although slightly inferior in quality to that yielded by *Landolphia Kirkii*, exhibits excellent physical properties. Investigations conducted by the Company's administrative officials show that this tree is abundant in several districts in these Territories (*i.e.*, Manica and Sofala, T.R.S.), and steps are being taken to test its productive capacity.

In the "Kew Bulletin," No. 7, 1907, page 283, is given an interesting account concerning this tree by Dr. Otto Stapf, from which it appears that the tree occurs in British East Africa and German East Africa, and that it yields the ball-rubber called Mgoa rubber in the Zanzibar trade. From a sample sent by Mr. E. Battiscombe, Acting Conservator of Forests at Nairobi, B.E.A., collected near Mombasa, the following report was prepared by the Director of the Imperial Institute:—"Mark and weight of sample:—'Rubber from Shimba Hills, East Africa Protectorate,' 104 grams. Description—Single ball of rubber, about 2½ inches in diameter, evidently formed by winding threads of rubber upon a central mass; it was light-brown, and contained a considerable quantity of vegetable impurity. The rubber was fairly strong. Result of examination:—

|                            | SAMPLE AS<br>RECEIVED.<br>PER CENT. | COMPOSITION OF<br>DRY RUBBER.<br>PER CENT. |
|----------------------------|-------------------------------------|--------------------------------------------|
| Moisture - - - - -         | 10                                  | —                                          |
| Caoutchouc - - - - -       | 69                                  | 76.6                                       |
| Resin - - - - -            | 6.1                                 | 6.8                                        |
| Proteids - - - - -         | 3.5                                 | 3.9                                        |
| Insoluble matter - - - - - | 11.4                                | 12.7                                       |
| Ash - - - - -              | 2.29                                | 2.54                                       |

Commercial value—3/6 per lb. in London; the current price of fine hard Para from South America was 5½ per lb. Remarks—"The sample has the usual appearance of *Landolphia* rubber; it is of very fair quality, though the amount of insoluble matter is rather high. This defect could be remedied by careful collection so as to exclude, as far as possible, fragments of bark from the rubber. Consignments of this rubber, if well prepared, would be readily saleable at satisfactory prices."

Herr Hedde, Government Gardener at Dar-es-Salam, investigated the subject there in 1899, but reported rather unfavourably. However, "Attempts to take *Mascarenhasia elastica* into cultivation have been so far successful, as the plants grew fast even in dry soil, and flowered and fruited in their fifth year; but the flow of latex at that age was far too scanty."



If ever cultivation of this species is attempted in this Province, I would recommend the higher and moister districts rather than the flats. My observation would lead me to think stagnant water more fatal than drought, but I think the flow of latex will be found to correspond with the supply of running water available. The presence of this probably reduces the value of Quelimane rubber meantime. Johnson considers the latex of *Landolphia Buchanani* (or a closely allied form) equal to that of *L. Kirkii*; and finds that *L. florida* in his district yields what may be a marketable though low-grade commodity.

He also thinks it possible that a local *Ficus*, which he calls *F. Vogellii*, miq., may yield a Caoutchouc worth exploiting, as samples prepared by him from the same species on the west coast were valued by London brokers at 2/- per lb. Every *Ficus* yields latex, more or less, but I presume he refers to what I have described as *F. utilis*, of which I sent Gutta-percha to London from Natal Maputa in 1904, under the name Mpai, and was favoured by the Director of the Imperial Institute with the following report:—“The sample of ‘Mpai’ rubber submitted for examination consisted of a flat elongated cake, which weighed about 35 grains. It was light-brown externally, but the freshly-cut surface was less coloured and showed a pinkish tinge. The material could be easily indented with the finger-nail, and exhibited very little elasticity but considerable tenacity; it had a somewhat fibrous structure, resembling that of gutta-percha. When placed in warm water it softened a little without becoming sticky, and could then be readily drawn out to a considerable length, but the elasticity was only very slight. The physical properties of the material seem to be intermediate between those of true rubber and gutta-percha, a common feature of the products yielded by species of *Ficus*, but in composition, as shown by the analysis shown below, it is much more closely related to rubber. The chemical examination furnished the following results:—

|                       |   |   |   |   | SAMPLE AS RECEIVED. | CALCULATED FOR |
|-----------------------|---|---|---|---|---------------------|----------------|
|                       |   |   |   |   | PER CENT.           | DRY MATERIAL.  |
|                       |   |   |   |   |                     | PER CENT.      |
| Moisture              | - | - | - | - | 28.4                | —              |
| Resin                 | - | - | - | - | 49.9                | 69.6           |
| Caoutchouc            | - | - | - | - | 19.6                | 27.4           |
| Dirt                  | - | - | - | - | 2.1                 | 3.0            |
| Ash, included in dirt | - | - | - | - | 0.79                | 1.10           |

The material, therefore, consists principally of resinous substances, which form 69.6 per cent. of the dry material, whilst only 27.4 per cent. of true caoutchouc is present. The isolated caoutchouc was not very strong, but was quite free from stickiness. The sample was submitted for commercial valuation to brokers, who were informed of its chemical composition and properties. They report that the material would be suitable for certain technical purposes and that sales could probably be effected at about 10½d. or 11d. per lb.”

Forester Gryspert, of Maputa, who prepared this sample, wrote as follows:—“The Mpai grows both near water and also to perfection in dry sandy bush. Mpai will give, in my opinion, a gutta-percha, if not of the very best quality, of such quality as will make it pay better than *Landolphia*. This sample shows that the latex of Mpai can be worked with freedom from stickiness in its natural state, without either boiling, water, heat, smoking, or chemicals; the sample enclosed is pure unadulterated latex of Mpai, worked by hand after 48 hours’ rest. Latex of Mpai contains very little water, practically none, consequently there is no loss. Of Mpai trees I would certainly put 300 or 400 on the acre, and the weight of gutta per acre would be about double that of Para, or any other rubber. I can now collect in one day one quart of latex of Mpai. This quantity should be increased in plantations.”

This *Ficus* grows in abundance throughout the Province and is easily struck by large cuttings; it is the same tree from the liber of which the M’Chopes natives manufacture their native cloth, and it is used for cordage wherever it occurs. While I do not share Forester Gryspert’s optimism as to its utilisation being more profitable than that of *Landolphia* I still think, considering its enormous flow and easy culture, that there is money in it, especially on light sandy soils, and near running water. There are various Apocynaceous trees and shrubs besides *Mascarenhasia* which may be worth attention in this respect, particularly *Voacanga Thouarsii* and *Conopharyngia ventricosa* and *C. elegans*. All these bleed on being tapped, but most profusely from the large fruits, and as the latter species is found in great abundance in the extra-tropical districts, and with a little encouragement would be much more so, and fruits abundantly, I think it probable that a large industry may yet be established in the collection and tapping of these fruits, in which every woman and child could take part. The latex is used by the natives as bird-lime; and I am not aware that it has ever been analyzed, but the simple cultivation, the easy collection, and profuse flow of latex all indicate that further attention may be repaid.

*Diplorhynchus mossambicensis* also bleeds freely, especially from the fruit, but as this occurs only in the tropical districts, where *Landolphia* is not yet fully utilised, I think its time has not yet come.

An Euphorbiaceous tree of rapid growth and large size found by me on the south side of the Inharreme River only, but said to grow through Zuvalla, of which specimens obtainable were insufficient for identification, yields a most abundant flow of rather thin latex, more abundant indeed than any other of our trees, but as it did not

coagulate on exposure and I had no means of taking it with me I cannot say if it will be found of value, although I consider it should receive further investigation. It has 3-lobed fruits 2 inches in diameter, and was named by the natives Enchowana. This name, however, is not distinctive, as it is used for several fruits used as ankle-rattles by the boys. The tree appeared to me to be one which, if the latex be found useful, could be more easily handled in cultivation than any other rubber suitable to the climate, hence my regret that I only found it once and did not then manage to take the latex with me, as I would have endeavoured to do had I thought I would see no more of it. The place where it was found was nearly opposite Inhucua, where there are several pile remains of river fortresses in which the natives lived during Gungunhama's raid, and is perhaps ten miles up the river from the Administrador's station. *Euphorbia grandidens* and *E. Tirucalli* also yield latex which solidifies, but has been used for various purposes giving them a low value. I am informed, however, that the rubber of the latter species if partly burned becomes more elastic and of higher value.

## II.—TAN BARKS.

At present the only trees or plants used in this Province for the production of tannin are the Mangroves, and what is done in that way is all for export trade. Mr. Barrett has favoured me with the following figures, showing exports of Mangrove Bark from those parts of the Province of Mozambique administered by Government, viz. :—

|      |         | KILOS.     | VALUE IN REIS. |
|------|---------|------------|----------------|
| 1904 | - - - - | 4,390,297  | 27,878         |
| 1905 | - - - - | 3,192,754  | 24,992         |
| 1906 | - - - - | 5,185,007  | 47,116         |
| 1907 | - - - - | 13,260,208 | 108,742        |

Owing to the rapid exhaustion of the better kinds, Government has now temporarily prohibited the export of Mangrove bark, but encourages the plantation of those kinds likely to be of use. The Mangroves grow on tidal mud, seldom directly facing the sea, but along the rivers and lagoons just inside, and for many miles up. They do not occur beyond high-water mark, though often in places which are only occasionally under salt water; on the other hand they stand being daily submerged under sea water for several hours. To hold them firm in such localities most of them send out adventitious roots from up the main stem, which, extending outward, reach the mud and form side supports. Several have also curious gnarled or flat plates as roots, and some send up from the mud abundant rush-like special aerial roots for breathing purposes. Most of the Mangroves have also special arrangements whereby the seeds germinate while still on the tree, and emit a fruit-like radicle which in some cases grows a foot long before the seed drops off the tree, and then acts as an arrow, piercing the soft mud directly below, and thereby planting itself at once. Unfortunately the least useful kinds are the more assertive, and *Avicennia* takes possession wherever it is allowed to do so.

It is with a view to prevent this and to extend the area under useful kinds that Government now encourages the collection and removal of *Rhizophora* seeds wherever obtainable, and their being planted in localities where they are scarce or absent. No class of afforestation can be so cheaply performed as this, since the ground requires no preparation, and both the collection and planting of the seed can be done from boats when the tide is high.

Several species under the common name Mangrove (1), Mangal or Mangle (2) occupy such sites in company almost all round the world in tropical mud, but they are not all equally valuable for tan purposes and probably the indiscriminate use of these various kinds has led to the conflicting evidence as to the value of Mangrove bark—varying from 4 to 50 per cent. tannin. Among the kinds which so occur here are—

1. *Rhizophora mucronata* }
2. *Bruguiera gymnorhiza* } = Infise.
3. *Ceriops Candolleana* = Mucandara.
4. *Carapa moluccensis* (*Xylocarpus Granatum*, Koen.) = Mutanameda.
5. *Lumnitzera racemosa* = Mormoni.
6. *Sonneratia acida* = Mucatanga.
7. *Heritiera littoralis* = Muolobo.
8. *Avicennia officinalis* = Mcandella, Tobose, &c.

besides several others in smaller quantities.

I went thoroughly into the question of kinds and found that shippers had been in the habit of purchasing Infise, Mucandara and Mutanameda bark indiscriminately, and from collectors I learned that Mucatanga bark was also collected by them though possibly shippers did not know this. *Rhizophora* and *Bruguiera* are included together as

Inise, and natives who had worked in the trade could see no difference when I pointed it out to them, being inclined to think the difference in the flowers either the flowers of, or the result of, boranthis parasitism. There have thus been at least five species yielding bark which has been shipped, without any accurate knowledge as to their relative value. The same thing is happening in other parts of the world where other species are also included, and it is consequently not surprising to find the following remarks by Dr. J. Gordon Parker in the "Year Book of the Manchester, Liverpool and District Tanners' Federation," 1905, evidently under the impression that one species supplies all. "Mangrove Bark. Probably no material differs so much in strength and character as the bark of the Mangrove tree, and no material is more deceptive in appearance; in fact, from a general examination of the bark no conclusions whatever as to its tanning quality or strength can be drawn. Some years ago Professor Eitner, of the Vienna Research Station, stated in a report that Mangrove bark would not make a satisfactory leather; that it simply coloured the fibres of the pelt, and the resulting product dried out hard and horny and of a deep mahogany colour, and that it could not be claimed to be a tanning material worthy of any consideration. Dr. Passler, of the Freiberg Research Station, on the other hand, reported in high terms of the value of Mangrove bark as a tanning agent, and either alone or blended with other tanning materials claimed that it produced leather of good quality, well-tanned, and of good colour. There is an old saying that experts always differ, but in the case of Mangrove bark these diametrically opposite views were probably both correct, i.e., each view correct with regard to the special sample or samples of Mangrove being experimented with. I possess a collection of over 50 different samples of Mangrove bark, and think I may safely say that there are 20 different and distinct kinds of bark among them. Probably as years go on, the number of different kinds of Mangrove brought to the market will increase, but of these 20 they all differ in character, colour, and tannin strength, yet all have a similar external appearance. Some samples show on analysis over 50 per cent. of tannin; many less than 20 per cent., some even as low as 2 per cent. and 3 per cent. Some samples contain a high percentage of soluble matter, which, although probably akin to tannin, does not combine with the pelt fibres at all readily, and although it is possible with such a sample to obtain a liquor of 60 or 80° Bk., it will scarcely tan pelt, but imparts a dark mahogany colour, colouring the fibres through and giving the pelt the appearance of being tanned."

These are the tanners' difficulties, and if the Mangrove export business is ever to be of value here again they require attention. An interesting *resumé* of the subject appears in the *Bulletin of the Imperial Institute*, 1906, Vol. III., No. 4, from which the following specially interests us:—"It has long been known that all parts of the Mangroves, and especially their barks, contain tannin, but it is only comparatively recently that Mangrove bark has been systematically collected and imported into Europe for the use of tanners."

"The Mangroves best known as yielding barks suitable for tanning purposes are *Rhizophora mucronata*, *Rhizophora Mangle*,<sup>1</sup> *Bruguiera gymnorhiza*, *Ceriops Candolleana* and *Roxburghiana* and *Kandelia Rhedii*." Mangroves yielding barks rich in tannin are fairly widely distributed in tropical countries, and in recent years a good deal of attention has been paid to the exploitation of these materials in various countries, notably Germany and Belgium. The best known Mangrove barks in European commerce are probably those of German East Africa, which have been made the subject of special study by Dr. Busse (Chem. Centr., 1899, 1 (4), p. 315), and by Prof. Körner, whose analyses are recorded in *Jahresberichte Gerbschule*, Freiberg, 1899, 1900. These results show that the richest Mangrove barks obtainable from German East Africa are the 'Mkaka' derived from *Rhizophora mucronata*, which may contain as much as 48.0 per cent. of tannin, though samples containing only 21.3 per cent. were examined. The 'Msinzi' bark, derived from *Bruguiera gymnorhiza*, contained from 44 to 53 per cent. of tannin, whilst the 'Mkandaa' and 'Mkamavi' barks, obtained from *Ceriops Candolleana* and *Xylocarpus granatum* respectively, contained 42.3 and 40.5 per cent. of tannin. Quite recently a similar series of barks from Zanzibar was examined at the Imperial Institute, and the results, which were given fully in the *Bulletin of the Imperial Institute*, 1904, Vol. II., page 165, showed that the Msinzi bark of Zanzibar contained 35.8 per cent. of tannin and the Magoni and Mkomafi barks of Pemba 32.8 and 23.8 per cent. of tannin respectively. These East African barks seem, on the whole, to be richer than those of India and the East Indies." Figures follow to show that these same species show lower percentages there, sometimes much lower. Queensland and West Africa are also productive, but in the latter area the natives make too much of Palm oil to bother with bark. "In German and Portuguese East Africa, where Mangrove bark has perhaps been more systematically worked than elsewhere, the Mangroves were at first cut down for timber, and the bark was wasted until its value as a tanning agent was discovered. In the German Protectorate the bark is now stripped from the stem and branches of the living trees, conveyed to convenient centres, broken up and dried in the sun (or by artificial heat, produced by the combustion of Mangrove timber), and exported. The industry is under the control of the Forest Department, which insists on the bark being carefully stripped, so that the trees are not destroyed (stripped trees are said to renew their bark in from four to six months),<sup>2</sup> and the authorities also prohibit the export of bark containing less than 45 per cent. of tannin. . . . H. M. Consul at Mozambique in a dispatch in 1904 to the Foreign Office, states that the quantities of Mangrove bark exported from the principal ports of Portuguese East Africa during 1904 amounted to 12,105 tons. These exports seem to have been sent principally to Germany, the United States, and Russia, small quantities only being sent to the United Kingdom. In addition to these large exports it is further stated that a large amount of Mangrove bark was, at the end of 1904, lying in the various ports awaiting collection, and it was understood that two sailing vessels were being chartered to convey it to Europe, owing to the uncertainty of steamship facilities for the transport of the bark. The value of the bark in European markets at the end of 1904 is stated by the Consul to have been from

<sup>1</sup> Not belonging to this Province.

<sup>2</sup> This occurs with only a very few kinds of trees, and it would be strange if all these Mangroves did so.—T.R.S.



£4 10/- to £6 10/- per ton, and he goes on to say that while the demand in Germany was slack, that in the United States and Russia was firm. The cost of collecting, drying and packing the bark in Portuguese East Africa is estimated at from 20/- to 30/- per ton, including the export duty of 2½/- per ton. The freight to Hamburg at that time was about 32/- per ton." It would appear that a considerable amount of Mangrove cutch was about the same time being imported into Britain from British North Borneo, principally to be used by dyers, and the process of making Mangrove extract is described in detail, finishing up with:—"The total cost of a small plant arranged on modern lines for the manufacture of Mangrove extract, and with a sufficiently large capacity to be remunerative in working, would probably be from £450 to £500."

Apparently the dark-red colour of leather tanned by Mangrove bark or extract is objectionable, and to get over this difficulty it is used along with several other tanning materials. Dr. J. Gordon Parker remarks, "The opponents of the Mangrove bark and extract attempt to raise the salt bogey. All Mangrove barks and extracts contain salt, varying from 1 per cent. up to as high as 3 per cent., but in my opinion as neither Mangrove bark nor Mangrove extract would be used to more than about 10 per cent. of the total tannage in any tannery, this would not bring the percentage of salt as high as is contained in the early liquors of a tannery tanning heavy South American salted hides."

The export of Mangrove bark from this Province was carried on most largely from Quelimane and Mozambique and such small ports as Bajon and Port Amelia. Although I saw much of the various Mangroves I saw little in good condition for barking, and consider the Government has acted wisely in placing a temporary restriction on the export. The only difficulty is that the comparatively worthless *Avicennia* is taking possession where better kinds should be growing and the future crop is thereby lost, unless the planting of seed can be actively carried on in all suitable localities.

Another bark which may possibly come into commerce as a tan agent is that of the various species of *Brachystegia*. I have no analysis to give, but understand that samples tested gave about 18 per cent. This is too low for a commercial article of export as bark, but considering the enormous quantity of bark of these species that exist, especially in M'Chopes, and the ease and rapidity with which it renews itself when destroyed, it appears to me that the establishment of extract plants by Government or Concessionaires should be taken in hand, especially if these can be of a movable nature and carried forward as work proceeds.

An extract showing 60 per cent. tannin would be worth freight and attention even under present conditions but much more so if a railway from Chai-chai to Inhambane were constructed and this extract plant erected on a railway truck so as to be movable to any locality along the line. The timber of the same tree will supply the sleepers for this railway, so a locomotive engine working a movable extract plant and saw bench should be fit to form the line and find traffic in each direction as it proceeds—rails inward and bark extract outward. There are probably many other tan barks especially among the *Acacias* and other Leguminous trees, but if so, this has still to be ascertained.

### III.—CLOTH, SACKING, FIBRES, &c.

Cloth is perhaps hardly the right word to use for the various materials used as clothes and blankets by the natives in most parts of the Province; they are not woven fabrics, but simply the cambium layer of the bark stretched and beaten till it is clean and dry and consists of fibre only. This can be done with several species and probably in all localities, but it is curious that certain districts have practically a monopoly of the manufacture, and supply the other districts. Two species are selected as the best, viz., *Ficus utilis* and *Brachystegia spicaeformis*, though other species of *Brachystegia* are also occasionally used. These two species occur throughout the Province from the Limpopo northward, and the *Ficus* southward also, and it is consequently curious that in the M'Chopes district, where both are abundant, the *Ficus* only is so used; while north of the Zambesi, where also both are present, the *Brachystegia* only is used. In M'Chopes the manufacture is quite an industry; in the neighbouring districts, both north and south, no cloth is made, but supplies are obtained from M'Chopes, while in Lourenço Marques where the *Ficus* is plentiful, it appears to be not known that it is the same tree, or that cloth is obtainable from it, European fabrics being in general use there.

The manufacture is of an exceedingly simple nature. In the case of the *Ficus* a stem about 9 inches diameter and without branches is selected; the bark is cut all round at the base and at the required height—usually 6 or 7 feet—a straight cut down one side is made and the bark peels off easily in one piece; the latex flowing freely meantime. The outer rough bark which contains the latex is shredded off, leaving the cambium only, which is kept quite entire if possible.

A dry log, without bark, lying on the ground, is used as a table on which to beat, and small wooden mallets with grooved faces are used. About four natives sit on each side of the log, the bark is placed on it with the rough side upward and beating begins, the part being beaten at any one time being kept flat by all pulling tight with one hand and beating with the other. One part after another receives attention and by the end of a half-hour or an hour in accordance with the industry used, a blanket 6 or 7 feet long and 5 or 6 feet wide, soft and pliable, untorn and only requiring a little drying, is produced. These may be worn complete as dresses by the women, or one such may be cut into 2 or 3 loin-cloths for the men, and are the only clothing used except beads, strings and trinkets. As blankets they are the only thing used, and are soft and comfortable. At first they are open and porous, and can almost be seen through, but after being worn a few days they get filled up with dust fixed either by perspiration of the wearer or by the oil with which most of them rub their bodies, and are then considered warmer and more comfortable.

Bark from a stem having branches is not used as a hole is left in the cloth where each branch was, and on purpose to avoid this difficulty the M'Chopes natives have learned and practice the method of coppicing these Mpaam trees and thereby producing a few vigorous, clean, unbranched stems from one old root.

In the case of the *Brachystegia* which is very abundant in M'Chopes and used for other but not for this purpose there, but which is the principal cloth-tree north of the Zambesi the process is very similar, except that when the beating is finished the material still retains a firmness and rigidity which is not comfortable, and to get that removed the women have to chew the whole piece, bit by bit, until it is soft and pliable.

Without the chewing, and without being opened at one side, the same bark is used as the principal sacking material in Zambesia, the tree in this case having to be cut down, and the bark cut to lengths and beaten upon its own stem until it is clean and loose and slips off entire, requiring only each end to be tied with a shred of the same material to have the bag complete. Many hundred such bags of earth-nuts were seen passing to the coast, each bag containing a man's load, viz., 60 or 70 lbs. They were also seen in use for holding mealie-meal, cassava-flour, beans, Kafir corn, salt and the various other commodities in use in the district.

These sacks were not seen in the southern districts, where the usual method of storing such products was in drums, still made of the same *Brachystegia* bark, but unbeaten and consequently rigid; and sewn into form with strings of itself, or pinned into form with wooden skewers. These drums, water-buckets, cradles, beehives, &c., made of this bark are wonderful adaptations and answer their purpose perfectly.

In M'Chopes, *B. spiraeiformis* appeared to be the only species present, but in Zambesia the several species of *Brachystegia* were used in the same way, apparently without choice.

Barks or cambiums used as fibres for cordage were abundant everywhere, and it appeared to be a matter of no difficulty anywhere for a native to find fibre to tie up a bundle. The word M-lolo, or some corruption of that word, is to be found throughout the Province, as well as in Natal and Cape Colony, indicating useful fibre plants which include almost the whole of the Families *Malvaceæ*, *Sterculiaceæ* and *Leguminosæ*, as well as many species belonging to other Families. It did not appear to me however that any commercial fibre is obtainable in quantity enough in the wild state to warrant exploitation; if there is one such it is *Brachystegia*. The fibres quite suit the local purposes, and are obtainable in sufficient quantity for these, but beyond *Brachystegia* there is no large supply in one locality to found an industry upon. Even the Pine-apple, which in M'Chopes is abundant in a semi-naturalised condition, is at present in too scattered form for machine manufacture, and machinery fit for this fibre is not yet perfect.

*Sansevieria* occurs in very scattered distribution, but seldom more than 1-2 feet high and nowhere in bulk; *S. Stuckii* I only saw in cultivation; it has terete leaves a yard or more in height, and under easy and rapid conditions of culture might be useful, but its propagation appeared to be slow. The fibres from the leaves of palms, such as *Hyphaene* and *Borassus*, while useful in their own way are expensive, as the collection of quite young leaves involves very scattered work, and no useful fibre is obtainable from the stems or leaf-bases, as happens with *Raphia* elsewhere.

On the whole I consider the fibres fit for local use rather than export. Cotton may prove different, in so far as cultivated cotton is concerned; with suitable soil, favourable growing season, dry harvesting season, and abundant cheap labour, the only desiderata left are immunity from insect pests and the introduction of more cheap and regular transport. Its cultivation is however a matter for large holders rather than for the natives; it is a crop which easily goes wrong and which requires very close and constant attention, and unless under European supervision I do not look for native culture proving successful. Meantime what little there is of native cotton culture is harmful rather than otherwise, since it provides a perpetual home for all the pests the plant is subject to, and still produces no revenue. Wild cotton is seldom abundant and it may be doubted if any white cotton with long staple is actually indigenous. What is usually taken for wild cotton is a *Convolvulaceous* creeper, *Ipomaea albivenia*, worthless as cotton, in so far as is at present known.

Kapok, the "cotton" of *Eriodendron*, is a promising though low-valued product of the same nature; the tree is naturalised in the north and could without difficulty be increased in regular plantations by planting it between rows of *Sisal* or *Mapira*, and thereby securing a present return while the more permanent tree is growing into fruiting condition. The *Sisal* itself is not indigenous and hardly naturalised anywhere, but is one of the coming agricultural plants of the Province, and is even now being planted largely with a view to the exportation of its fibre.

#### IV.—GUMS, DYES, MEDICINES, &c.

GUMS. The natives have no use, or little use, for gums, and so far practically no export has taken place. A small amount of Copal is exported, but what it is produced by has not been definitely ascertained. I saw some very beautiful samples, probably from *Trachylobium* or some *Acacia*, but the quantity available is exceedingly small unless its exudation can be assisted by wounds or otherwise. The various *Commiphore* yield resin, but not in large quantity; it is possible however that the flow of this could be augmented artificially, and so also with *Eriodendron*, *Bombax*, *Sterculia*, *Adansonia*.



The gum of *Sorindeia* is used locally for caulking boats, &c., and is most adhesive, and is produced in some quantity on the tree being wounded; the latex from *Euphorbia grandidens* has a similar use, and the latex of the several species of *Mimusops* is known to the natives for allied uses.

**DYES.** The natives appear to be colour-blind or colour-ignorant, at least in most localities they do not easily distinguish colour and hardly have words representing colours. In such case it is no surprise that dyes are not in demand, and that what dyes are present locally are not known or their use understood. The Mangroves, which at least can colour leather, are not used as local dyes, nor is the tannin principle in *Brachystegia* or the colouring agent in *Terminalia* so used. The native dresses are entirely uncoloured; the Banyans import Indian coloured goods for themselves and probably the only local use of colour that I saw was from the fruit of *Thespesia*. In a few cases I found fishing lines coloured to make them invisible, but could not find the agent. *Indigofera* species are frequent everywhere, but I could not ascertain that they were used anywhere as dyes, or that any other leguminous plant was so.

**MEDICINES.** In no line was my tour more disappointing than in that dealing with medicines. There is of course a very natural hesitation among those who are practising "black art," or whatever it may be called, to divulge any of their secrets of income-making, and just as it would be difficult for a savage to arrive in England and find out in a few weeks the secrets of the *Pharmæopia*, so is the position there to a stranger. Through the kind assistance of the Administrador of *Magenja da Costa*, I had however an opportunity of meeting four local native practitioners, noted for the cures they had effected, and who produced a large number of plant specimens, and, so far as I could see, straightforwardly and unreservedly informed me what they knew concerning the uses of these. But this is where my disappointment came in. Medicines, according to our use of the term, were hardly included, and when I mentioned fever, lung trouble, stomach trouble, rheumatism, &c., they had nothing to produce as a cure. Preventives against snake-bite, courage-giving lotions, materials for washing babies, purifying agents, and other superstitious or faith-healing recipes were abundant, love-philtres and excitants to sexual desires were numerous, and there were many others connected in some way with allied unlawful and objectionable practices. For cuts, blisters, sores, &c., the beated leaves of *Aloe maculata* was in common use; a few plants were known poisons; but for any actual medicine it seemed as if the whole district one hundred miles across believed more in the Administrador's supply of imported medicine than in any medicines of its own. At the Bajon salt factory I found castor oil beans being used to oil the fishing lines to make them durable, and still these natives knew nothing about the poisonous or medicinal powers of these same beans. Superstition and faith appeared to underlie all cures; and though I took voluminous notes of what these doctors had to say, I do not find a single item worth repetition. In *Manica* the *Columba Root* (*Iatrorhiza*) has attained some reputation, and is being exported as a drug; while the seeds of *Strophanthus Kombe* are a known poison, used as an arrow poison, and probably also possessed of medicinal qualities. Experimental shipments have been made by the Mozambique Company.

A very large number of trees and shrubs are reputed to have a poisonous effect on fish, and to be put in the water on purpose to bring them to the surface, when they are killed and eaten. As this practice does not deserve encouragement, I do not think it advisable to enumerate these specifically here, but I look upon these as being better worth attention from a medical point of view than the remedies actually in use. They may be more powerful, and consequently beyond the control of the savage, but they are at least possessed of some active principles which science might find a use for.

## V.—OILS.

From the Limpopo to Inhambane has long been noted for its oil products, and even from the Northern districts, oil-nuts are still shipped. These latter are the seeds of *Arachis*, not indigenous within the Province but cultivated largely in every part of it, both for home use among the natives as food, and for export to France for the expression of oil. This plant is not naturally a forest product, and is only mentioned here as one of the several oil producing plants of the Province and one which almost everywhere can be used as an export crop immediately after the forest is felled.

Sesame, (= 2, Gergilin; 10, M'piza) is also cultivated to some extent for the sake of the oil which is expressed from its small seeds, and about 1000 3-bushel sacks of this seed were waiting shipment at Quelimane while I was there.

A large creeper, *Telfaria pedata* (6, Makungu, Jekungu,) is cultivated round native kraals for the sake of its large and nutritious seeds which are said to yield 60 per cent. of their weight as oil, but no commercial export of this has taken place.

*Jatropha curcas* yields an oil from its seeds, which is a commercial export elsewhere, but here though it occurs throughout the Province no oil is expressed or seeds exported. The natives recognise the oily nature of the seeds, and string them on grasses, and after a short drying these are used as candles; hence the name candle-nut. The natives also know the powerful properties of the seed and avoid it. But it is more particularly the indigenous tree, *Trichilia enetica*, which is the source of oil for local use, as also during recent years for export. The tree grows abundantly south of the tropic; it is also present but less abundant north of it. The flowers, though they appear to be sexually perfect are not really so; indeed often, if not always, the trees are practically dioecious, some trees bearing a full crop every year, and others bearing none. The various



names given to the tree and its fruit are mostly connected more or less closely with the production of oil or fat (Mafura), which is obtained from the seed itself, and also from the aril by which it is nearly enclosed. This oil has long been used by the natives for rubbing on their own bodies and does not produce the rancid smell so characteristic of those natives who smear themselves with animal fats. In addition to this, the fat is largely used in food, and when all the oil is expressed the residue is considered edible. The usual process is to soak the seeds in hot or cold water, when the oil from the aril floats off; then crush the beans and express the oil; again crush the residue, boil and express; and sometimes this is repeated, the final residue being edible; thus 3 or 4 oils and one residual food is obtained from one lot of seeds. The oil is a thick clear oil, solidifying into a white solid grease; each oil is considered edible, or fit to use for local purposes or export, and a very considerable total must be consumed. Export has mostly been in the form of uncrushed seeds to the Transvaal or Natal; these seeds are exported in a nearly dry condition; and unfortunately the natives have learned that seeds already soaked and of which the aril oil is absent sell nearly as well as others if again dried, and make a practice of doing so thus incurring freight on a lower oil percentage. The result is dissatisfaction with the amount of product, as also the absence of the best oil. Only a very small proportion of the seeds produced are collected meantime, the natives being often too well off to collect at the price going. This industry might be enormously extended, from trees already in bearing, if more easy transport and central crushing mills were available so as to reduce the weight and bulk and increase the value of the product to be exported. The tree is meantime reserved by native custom, but instead of scattered trees whole forests of this tree might with advantage be artificially produced at points accessible by rail or barge, thus increasing the oil yield, lowering its cost of collection, and at the same time producing useful timber in the removal of such trees as prove non-bearers.

#### VI.—SPIRITS, FERMENTED LIQUORS, &c.

In this Province there hardly exists a plant from which the natives cannot obtain a drink. Of course they obtain it more easily from some than from others, and so give these preference and go to the trouble of protecting such trees or plants, or even planting them. But it appeared to me that though famine may at times be felt—through improvidence, bad management, or bad seasons—a scarcity of liquor intended for human consumption can hardly occur. The natives are professional experts also in the making of such liquors and it was surprising to see with what simple stills they could do it. An ordinary clay pot of large size, the top covered over with fresh clay, a gun barrel or a piece of gas piping for a worm, passing through a clay trough in which the worm is covered with water, and the apparatus is complete. I even saw a bamboo being used as a worm and in that case the whole apparatus was independent of European civilization. The distilling of spirit is illegal throughout the Province; it clashes with the trade in low grade Portuguese wines to the natives; but the police are few and native, and probably sometimes sympathetic, with the result that in the remote districts at least the only recognition of the law appears in the fact that the still is usually made in the bush rather than at the hut door, though cases of the latter were also seen. Among the favourite substances for the production of spirit are the "fruits" of the pine-apple and the cashew, the various Anonaceous fruits known as Shangala, Tinta, N'Kaloga, &c., and almost every other edible, or rather non-poisonous, fruit which exists. Cassava, Sweet-Potato, Cocoa nut, Mango all yield a quota as required, and though only once or twice did I see natives under the influence of spirits, an enormous total must be consumed. The fermented liquors often partake of the nature of food as much as drink and are in daily use everywhere. The Surra from the cocoa-nut milk is of this nature; so the liquor from the various grains; also the palm wine from the sap flowing from the cut crown of *Hyphaene* and other palms, and these are only a few of the many substances so used. The appearance of the liquor is usually not inviting, except to those who have acquired a taste for it, and the water used was often dirty and disgusting, still no native ever misses an opportunity of sampling any brew along the road.

The hospitality of the native apparently extends as far as shelter and food, but does not include drinks; these are extras, and are to pay for.

Probably an industry in spirit manufacture could be easily brought into existence, especially in connection with the Sugar factories, were it not against Portugal's wine interest; for that reason however the manufacture is prohibited and it is probable that no such industry will be encouraged.

#### VII.—DOMESTIC REQUIREMENTS.

Of these, food naturally takes first place, but in this the trees are not of much importance except in regard to the fermented foods already mentioned. The Cocoa-nut is used largely in the Northern districts, the *Trichilia* (Mafura) in the southern, in each case along with other materials. All edible fruits enter into the dietary, and where flesh-foods are scarce (except fish) it is surprising what fruits can be considered edible. The foods of the Province are however the various grains, Rice, Cassava, Sweet-Potatoes, Beans, *Dhol* (*Cajanus indicus*) and Cocoa-nuts.

*Inhamitane* Coffee deserves special mention here. Being indigenous, and fairly common in the forest in some places its product appears in commerce in sufficient quantity to attract some attention. Its cultivation however cannot be described as highly successful so far, when removed from its natural forest environment, or when that is removed from it, and though more proof against disease than the exotic species its culture is not extending rapidly. The flavour is different from ordinary coffee, whether naturally or by treatment I cannot say, but it involves the acquirement of a new taste. To my mind, Coffee culture in this Province is not beyond the stage of requiring an admixture of brains.

Fire is an important matter with the natives. At their kraals the fire is seldom allowed to go out; some log is always left in such condition that it will flare up again when wanted. But when moving from place to place they must either carry fire with them or produce it by friction, and they have discovered a good few shrubs suitable for the latter process. No one quality is common to these except easy ignition; some are hard, some very soft; most are shrubs rather than trees, and one seldom goes far without finding one or other of them. Among these are:—*Hibiscus tiliaceus* (M-holo.); *Dombeya* species, especially *D. Burgessii* (Nyakowe); *Erythrina* species (Nenugo, Insika, Indhlebe), *Lippia* sp. (Msumbe); *Trema bracteolata* (Inveyo); *Adina* (Mahonhe); &c. Generally dead dry branches are used and revolved rapidly between the hands, the lower end meantime resting in a hole in another log, often harder.

The only colouring matter for food seen in use was the Annatto, *Bixa Orellana*, which is largely used in curries. The ash from the burned bark of *Albizzia mossambicensis* is in constant use to mix with snuff, and is said to give it pungency, the ash of the dried leaves of an arborescent *Aloe* is in use in this Province and in Natal in the same way, as also through this Province is the ash of one small herbaceous plant.

### VIII.—FRUITS.

The indigenous fruits are numerous, and to the weary traveller—whether European or native—very refreshing. It is however difficult to draw the line as to what are indigenous and what are alien; so many of the better fruits being suspected of having been introduced at some previous time. The Mango for instance is found throughout the Zambesian forests, and is in many places the largest tree present; it is away from all present cultivation, but looking at the history of the district during past centuries, a suspicion is raised that it may originally have been introduced. On the other hand its seed does not long retain germinative power, and is not easy to transport even under civilised methods; and it is not likely to have been brought a long distance by accident or under crude methods. Whether Solomon and his emissaries or visitors had anything to do with the dissemination of this and other fruits it is now impossible to say, but it does not seem likely that Arab slave-raiders would have either intentionally or accidentally done such work, or that the Portuguese ownership is responsible for the presence of these trees in the back country.

So also in regard to the Cashew; it is almost ubiquitous, and still its presence is more distinctly related to human occupation than is that of the Mango. The Tamarind on the other hand seems the most decidedly indigenous of the three. The Orange is often present in native villages and sometimes where no habitation now exists, but the latter condition is usually an effect of Gungunhamas raid or some similar disturbance. Some sweet varieties are occasionally propagated by root buds by the natives, the half-inch roots being cut off near the tree and tied up to a pole, the fibres remaining undisturbed until the cut root has produced buds and ripened branches, when the new plant is carefully removed to where there is room for it. The native oranges are large and succulent, but though not actually bitter they cannot be said to be sweet. Fortunately they are usually quite clear of scale.

The various imported species of *Anona* are cultivated by the Europeans and Banyans; the wild *Anona* is spoken of as edible, but not being in condition when I was there, I cannot speak from personal experience. The *Garcinia* is also considered edible, but I think its place is probably rather as a stock for the Mangosteen than as a dessert fruit itself.

The Amatungula (*Carissa*) occurs both wild and cultivated as a hedge; its fruit, though edible and pretty, is nicer when made into jam than when raw. Of the numerous other native fruits seen by me, I do not think any one is likely to take a permanent place in tropical horticulture as a delicious dessert fruit. Some are quite good enough for native use, others may be improved by cultivation; some local fruits may not have been seen by me, as I was rather late, but speaking generally, there was nothing outstanding among what I saw. The introduction and propagation of exotic fruits will be more immediately of advantage and remuneration than any endeavour to bring indigenous fruit as such before the world.

### IX.—ORNAMENTAL TREES AND SHRUBS.

With such a large and widely varied forest flora it would be surprising indeed were there not some horticultural subjects of special beauty, especially since such a large proportion belongs to that ornamental group *Papilionaceæ*. I was not in the Province during the rainy or flowering season, but I saw enough to make me believe that in the proper season the forests of the Province would be a perfect paradise of flowers. Beautiful white scented *Gardenias* and *Oncobas*, purple and violet *Bolusanthus*, *Lonchocarpus*, *Bauhinia*, *Securida*, *Millettia*, &c.; the lilac trusses of *Vernonia*, the Yellow *Cassias*, *Peltophorum*, *Acacias*, *Pterocarpus*, &c.; the scarlet flowers of the *Erythrina*, the Golden Yellow *Sophora* with silvery-white foliage; the weird and curious flowers of *Kigelia* and of *Strophanthus*; the long scandent tresses of *Tecoma* and the climbing crimson *Combretums*, and many others, bright, beautiful or grotesque, combine to produce in most localities a pleasing and ever-changing scenic effect. Most of the more ornamental kinds are already in cultivation elsewhere, but it is probable that a summer visit to Zambesia would reveal many additional and ornamental novelties, well worth a place in tropical horticulture.

## CHAPTER VI.

**Recommendations Concerning Utilization.**

**I**MMEDIATELY after my return to Lourenço Marques from my journey through Gaza, M'Chopes, Inharreme and Inhambane, I submitted to the Provincial Government a general report on the economic conditions which attracted my attention in these districts, and on my return from Zambesia I submitted a further and somewhat similar report on the general conditions prevailing there.

These two reports, which cover the general ground rather than the purely forest aspect, contain a good deal in reference to the Province which is not otherwise included in this work, so I have considered it advisable to introduce them here in full, followed by such further recommendations as may appear necessary, finding that nothing stated in these reports requires alteration or qualification after several months further study of the subject:—

**Report on the General Economic Conditions in the Districts of Gaza, M'Chopes, Inharreme, and Inhambane.**

*Reprinted from "O Futuro," Lourenço Marques, July 18, 1908.*

"The economic development of the Province of Mozambique depends on many problems so intimately interdependent that for general purposes they must be considered together rather than separately, though each may be specialised afterwards. In the small portion which I have seen so far, viz.:—the neighbourhood of Lourenço Marques and the coast districts from the Limpopo to Inhambane, the following general features struck me.

- (a). *The happy, contented, loyal, industrious, agricultural, native population.*—Forming as it does in some districts the total population, in all others almost the total, this factor is, I consider, the one of first importance. Without the settled and friendly relations which exist between Government and population, agriculture or any other culture or development would be practically impossible, and in this matter the position as compared with the British portions of South Africa where influence from England often affects local action, and leaves the native in a position altogether unintelligible to him, is all in favour of the Portuguese method in which the strong but gentle hand is recognised as all powerful. Possibly the natives are naturally more agricultural, more peaceable, and more industrious, than those in the other South African Colonies, but it is the fact that the Government has here a better nucleus from which to develop an actively productive native agricultural community under European management than exists elsewhere, while at the same time settlers and concessionaries have the necessary labour available at easy rates for whatever they may take in hand. The position thus is practicable of having large producers or Companies working side by side with native growers, and each able to obtain satisfactory results. The exploitation of large areas, probably whole districts, by means of native producers, in such manner as to produce much more than the local requirements, of material having value elsewhere, requires earnest consideration and assistance. But this brings along with it the fact that:—
- (b). *Better transport arrangements are necessary.*—The country already produces much that might be exported were transport available; since transport is not available all surplus (and probably more) is converted into fermented liquor for local consumption, and against the public good. The Inharreme River forms a waterway of great value, but at present it leads to nowhere. Were this connected by rail with one or both of the neighbouring ports an export of produce in addition to or instead of an export of men would certainly result. Considering the level nature of the country, the sandy soil, and the low local value of labour, I consider light development rail tracks, even without engines, would be of high value as feeders to a main line.
- (c). *Each locality requires separate consideration*—Geographical position, soil, climate, available transport, and the local cost of labour, all tend to render impossible any general treatment, and this is accentuated when the northern sections of the Province are also considered. In each of the districts I have seen there are immense possibilities, practically in every portion, but the crops and the treatment differ sharply within very short distances.
- (d). *Lourenço Marques.* There is scope for an immense development in this district in the direction of providing winter supplies and early crops to the Transvaal and other South African Markets, as well as for the better supply of the local market. With a climate capable of carrying Garden crops which are impossible in most parts of the Transvaal during winter, and for which demand exists, it seems strange that these should be practically absent. In Natal there are growers who send



several tons of tomatoes per week to the Transvaal, right through the winter; others do the same with cabbages, others with cauliflowers, and others send large quantities of rose and carnation flowers. Lourenço Marques with its higher mean temperature and shorter railage is in a better position but sends practically none. The soil is conducive to early maturity, and even if the manurial elements have in some places to be added the mechanical condition is right almost everywhere except in the few soils of stiff clay. Close intensive cultivation of comparatively small well selected areas (10 to 20 acres) will give better results in this direction than M'Shamba cultivation scattered over larger holdings, but of course a crop suitable to the particular place must be selected. Then, as to all ordinary fruits such as:—Oranges, Naartjes, Lemons, Pine-apples, Avocado-Pears, Guavas, Waldo Peaches, Mangoes, Persimmons, Pawpaws, etc., selected early sites near Lourenço Marques should give several weeks lead in all South African Markets; that is, the highest price and the surest market would be secured before competition is possible from elsewhere. For the local market the extended culture of other ordinary fruits is desirable, while the more tropical kinds, grown in limited quantity, may also find a market. Even fruit culture for export is worth consideration, for while the Natal export of citrus kinds begins only in June, the same kinds are practically finished at Lourenço Marques at that time and can thus fill the gap of one month before that date, during which Europe is badly supplied with these kinds. For general agriculture many sites are more or less suitable, for sugar cultivation only a very few so far as I have seen, and in regard to trees and fibre I will refer later.

- (e). *Limpopo Valley*.—I regret that I did not see more of this valley, for what I did see, viz.:—up to Chai-Chai and for a good few miles beyond, is totally different to anything else seen in the Province, and so altogether superior that the surprise is that natives should have held it so long. A flat alluvial plain, extending as far as can be seen, and of width varying up to several miles, through which the Limpopo River winds its tortuous course at a depth only just sufficient to prevent overflow during heavy flood, and along the margin of which a narrow lake or marsh separates it from the foot-hills for a distance of many miles length, this valley forms probably the most fertile tract of large area in South Africa. With soil of great depth and first-rate quality, level enough throughout for steam cultivation, for surface irrigation, and for tram transport, no other such valley exists in South Africa for the cultivation of sugar on an extensive scale, and where the facilities for preparation, cultivation, collection and manipulation are so abundant. Mr. David Cagi, whose farm adjoins Chai-Chai, has a large area under lucern in good healthy condition, from which numerous crops had been cut and sent to the Transvaal. Without irrigation and even without deep culture this crop was excellent, and showed that a huge business in this line is practicable. But if lucern has its value for export it has an even higher value for eating off green, for which the sandy foothills adjoining the whole length of the valley and extending backward for a long distance ostriches and stock will probably give this in future a value corresponding with that of Oudtshoorn and the other small irrigated lucern fields of Cape Colony. Vegetables for local use are also grown to perfection. But it is for sugar-cane particularly, and as the subject of highest importance, that I consider this valley suitable. From Chai-Chai for miles up and down the river, and back to the lake, and probably by easy drainage including much of the lake also, the conditions are more suitable than exist extensively anywhere in Natal or Zululand, and remind me in an enormously enlarged scale of the few best spots in the lower Umhlatuze Valley. One or several central mills in this plain, connected by rail-tracks as well as by the river water-way, should convert a huge area round Chai-Chai into one large sugar-field, which extending outward as the demand arises, through the valley as a whole would do much more than supply the whole sugar consumption of South Africa. With no frost or drought, and with every condition suitable, the better varieties only should be grown, as the small and hard Uba cane so extensively used in Natal as the only possible kind on the unsatisfactory sites available there, cannot compare in weight of produce, sugar-content, or easy manipulation with the better kinds where these can be grown.

Meantime the natives, who are abundant in the valley, cultivate mealies, Kafir-corn, and the various Sorghums and Panicums, with splendid results, as well as Earthnuts, Sesame, etc., and also collect Mafurra seeds for oil, the course of the river being marked out by the presence of Mafurra trees and thus visible from a distance. The municipality of Chai-Chai has imported a Fowler two-engine steam plough plant for hiring to local farmers. This I saw at work on the flats.

- (f). *Quisico and Inharreme*.—These native districts consist of light and very sandy soil of great depth, usually without surface water, but sufficiently moist to carry full crops of mealies, millets, etc., and to carry Cassiva everywhere. The population is not industrious (for natives) and it appears to me doubtful if the benefit derived from the export of men to the Transvaal would compensate for their absence, if transport for produce were available, or factories established locally. Considering the fresh ideas and troubles imported from the Transvaal with returning men it may be questioned whether the result will not eventually be very serious. But, given transport and central factories, these districts alone could, by native labour alone, produce a surplus of more than the total export of the Province, as that used to be a decade ago, before the present enormous decrease began.

Mealies of an improved type would naturally be thought of as what the natives could most readily produce. But mealies are bulky and heavy, and consequently the cost of transport even with railage, must be considerable. The more concentrated a product that can be produced, the more profitable is it likely to be. Starch from cassiva, cornflour, tapioca, arrow-root, and various oils, appear the most promising. The number of available oil-plants is very large, but it appears advisable rather to select a few and work these up in bulks than to try too many, except in experiment work.

The *Mafuriera* is everywhere; the product must be enormous; meantime it is used largely for native food and cosmetics. But this oil, if worked up locally from good seeds which the natives have not even soaked for a first unpressed oil, will be one of the most valuable products of the district, and requires every consideration from the Government. The tree exists in quantity wherever I have been in the Province but especially in the Quisico Administration, and its utilization there will give the population profitable employment at home, in which all can participate, and still bring money to the Province.

Earthnuts they also grow and know and the culture would be extended, were the demand for the oil made from them local and sufficient to induce works. So also the seeds of *Telfaria pedata*, a climber grown by them and of which the seeds are used by them.

*Castor-oil* (*Ricinus*) might also be added to the list as its growth is most simple and it is already a weed there, while the import of the oil into South Africa is enormous. But in this matter guidance is necessary, as varieties vary immensely in their economic values, and only the best should be encouraged.

Other kinds might be mentioned but with the above and perhaps Sesame, which already is grown there, the list is long enough for the present. The present duty is to supply transport, and either arrange central mills or arrange central stores where supplies will be bought on reasonable and unvarying terms, and forwarded.

Fluctuations in price are fatal, and better begin with the lowest price that will bring the material than begin high and then drop afterwards. Rubber will be referred to later.

- (g). *Inhambanc*.—The more tropical conditions at Inhambanc are evident on the surface. Cocoa-nut palms everywhere, indicate a commercial factor not seen further south. Though this may be the outer limit of commercial cocoa-nut culture, it appeared to me that the trees were healthy, and productive at an early age, and that the crop was quite sufficient to warrant extended culture and the extended utilization of the product. The country is well adapted to cocoa-nut culture, and a large industry in one line is always advisable.

Other industries available are such as I have referred to above. The Sugar estate at Matembe shows good growth under curious soil condition, but the area available for sugar in the district is somewhat limited.

- (h). *Rubber*.—Almost throughout the district traversed *Landolphia* is present, often in quantity. From some places its export is carried on; from others it might be. The present position appears to be held by the Indian traders who can make or destroy the trade by their dealings with the natives, while the Government gets nothing except the store licenses. I am inclined to think that payment of hut-tax in *Landolphia* rubber at a fixed price, as an alternative to cash were the latter not available, might largely increase the product and give all natives more assurance of receiving value for what they collect. I saw no abusive cutting of *Landolphia*; and in no part did it appear to me that the present supply was being fully utilised. Other indigenous rubbers or gutta-perchas require further experiment. I saw many trees of *Mimusops Henriquezii*, from the bark of which latex may be expressed. Until this is further tested as to its value and volume it would be misleading to say anything about it. Other kinds have latex which flows freely; in some of these I know the product to be of low value; in others the trees are new to me.

Concerning imported kinds, Ceara Rubber is the only kind at present distributed widely. This tree grows rapidly into maturity even in the poor sand of dry localities. Reports from elsewhere recommend the culture of this kind only where other well-known rubbers are unsuitable. This is presumably the case through the district examined (except perhaps the Limpopo), but I saw no systematic plantation of Ceara, nor anything which indicated clearly that it can be grown with profit. Experiment in this is necessary as also in the cultivation of *Hevea* and *Castilloa*, which are almost untried and may yet prove satisfactory at Limpopo and in places at Inhambanc.

- (i). *Fibre*.—Throughout this part of the Province it is evident that *Furcraea gigantea* grows satisfactorily. Its growth on nearly pure sand at Matolla, and on similar soil at Quisico, as well as in many other places, convinces me that it is quite at home on such soil, and if kept off what is too wet will make as good growth there as anywhere else. Till lately the culture of this plant has been almost confined to Mauritius, where a condition of half-naturalised spontaneous growth is credited with allowing a special advantage. But the result is growth in all inaccessible localities, requiring wire ropes and other special means of transport to allow utilization, and it is incredible that such culture can compete with systematic plantations on level ground where moveable tram lines can convey every leaf direct from the plant to the mill, and where the growth of the plant itself is equally good, all of which latter conditions hold good here. I consider the future of this industry assured throughout the whole of Eastern South Africa, wherever intelligent selection, laying out and management are employed. The choice has to be made between this plant and *Agave sisalana* of which also plants are in cultivation in the district. In German East Africa plantations of *Furcraea* were replaced some years ago by plantation of *Agave*; in other parts of the World the *Agave* has usually been the first choice and held its position. But these localities are more tropical, and it seems prudent here to use largely the *Furcraea* which is an assured success as to growth as far south as Natal and Cape Colony and of which bulbils are available in any quantity at low price. Meantime the *Agave* may be under further trial and young stock raised, the market value of the two kinds being not seriously different.

*Pine-apple fibre* is a fibre of high quality and value, obtainable from the leaves of the Pine-apple (*Ananas*). The *Ananas* is used as a hedge-plant along every road and in almost every M'shamba throughout the Province, and there must be many millions of plants available in scattered order, from which to collect leaves. But the machinery for the preparation of this fibre is not yet perfect, and until a machine capable of producing as good fibre as that prepared by hand seen on the journey is in the market, it is doubtful if this can be utilized. It cannot profitably be prepared by hand.

*Sansiviera* which yields a good fibre exists wild, but not in quantity at any one place, and its plantation is not recommended in preference to *Furcraca* though its market value is higher.

Many indigenous plants yield fibre sufficiently good for native ropes but none of them are likely to meet market requirements. The native cloth prepared by beating the inner bark of M'Chailo (*Ficus* sp.) is a remarkable production which will take attention as a curiosity abroad, and may be found useful here for sugar bags, etc. Cotton culture also deserves attention.

- (j). *Timber*.—The amount of timber through the Province is enormous, but its distribution is exceedingly scattered, and in no part which I have seen can it be said to be in forest condition. Everywhere it is or has been more or less mixed with the M'shamba cultivation, within which the natives with their own utilitarian ideas of value have reserved only such kinds as yield a liquor by fermentation or distillation. The *timber* is of no value to them; timber trees are consequently destroyed without compunction unless they have the other use. But there are timber trees of very considerable value mixed among the others, which with better transport may come to be of value, and indeed may themselves form the sleepers for a tram-line to run upon, as well as the timber for stores, factories, etc., in outlying localities.

Along the coast the Red Mangrove appears to have been mostly cut out for its bark, and I recommend that the cutting of this kind be prohibited for the present, and its propagation by the distribution of seed in tidal mud carried out by Government. I also recommend the protection of several other species for various reasons, but leave these unnamed till I report further.

The use of *Mafurrera* (*Trichilia emetica*) has been already mentioned. Of exotic trees there are many quite suitable for local conditions and possessed of qualities which give them market value when conveniently placed; these will be discussed in a further report.

- (k). *General*.—The possible production of this portion of the Province is enormous, and exceedingly diversified, but the more important points, beyond stock-farming, may be summed up generally as follows:—

From Lourenco Marques—Early and tropical fruits, Winter vegetables, etc.  
 From Limpopo—Sugar, Lucern, Grain, etc.  
 From Quisico and beyond—Oils, starch, flours, etc.  
 From Inhambane—Cocoa-nut products.  
 From all—Fibre, Rubber, Oils and Grain.

“Government proof at the Experiment farms in regard to new or improved kinds, better transport everywhere, attractive land tenure on a fixed, easily understood and reasonable basis, suitable alike to the settler and to the Concessionaire, encouragement of native industries, and the establishment or encouragement by Government of Central Grain-mills, sugar-mills, oil-presses, rubber stores, saw-mills, etc., are the present requirements of the Province.”

### Report on the General Economic Conditions of Magenja da Costa.

*Reprinted from “O Futuro,” 22nd and 24th September, 1908.*

“The industrial development of Magenja da Costa is a problem now ready for solution. Within the past few years this vast area of roughly 15,000 square miles has been peacefully occupied and roads made; administration is now in full force, and it only remains to utilise the country.

“The material to be worked upon has been moulded by many past events; history is written everywhere, alike in the forests and in the people. The people, especially the Loamas in the northwest are the lowest type I have ever seen, too low to know how to maintain themselves properly, consequently though they have rice, etc., they eat these raw rather than go to the trouble of cooking them, and in consequence are miserable fleshless beings, without any moral or physical stamina; their further food is rats, mice,



cats, snakes, birds, etc. Ages of slave-hunting in the past have rendered them altogether improvident; they do not sow, consequently cannot reap, and their tenure of abode is of the slightest. Slave-hunting has thus left them abject beings, without domicile, without industry, without thrift, and ready to disappear again on the slightest excuse. It has also had another effect, which, to my mind, is quite as serious—there are no girls—every girl-child is a mother as early as that is possible, always before she herself is half-grown, and thus weak mothers and weaker offspring are the result; the race is going from bad to worse. This is a matter for legislation and penal restriction.

"*Effects of Arab Occupation.*—In the forest, which, except for clearings, covers practically the whole district, the effect is also evident; clearances made have been abandoned as soon as necessity arose, and new clearings made elsewhere; abandoned M'shambas with regrowth of all ages consequently occur anywhere. In the lower districts mangoes and cashews occur derelict, of all ages up to very large trees; the mangoes often the largest trees in the forest, the cashews often the most abundant over considerable areas while kopaks also occur in the most unexpected places. In the higher districts the tamarind is similarly scattered, whether indigenous or introduced long ago by Arabs it is now impossible to say, but at all events it is now widely spread quite irrespective of population, and it is often of large size. The only good the former Arab occupation has done is that it has left some embryo industries among the natives, such as the native salt factory at Bijon, the gunpowder factory further up the same river, and a few more or less skilled iron-workers and timber workers, and boat-builders of boats of European fashion.

"Physically the country is comparatively flat; except towards the coast it is not flat enough to be swamp, or to be flooded even in rain, but everywhere the undulations are easy; there are no hills except in the western portion, and these are igneous upheavals of almost pure rock and consequently useless for industrial agricultural purposes.

"It is well watered and well supplied with waterways, having the Lecunga, the Mabela with its affluent the Errin, the Rarraga with its large affluent the Nypiad, the Masemba, and the Tjunga (or Moniga) all traversing it eastward; the Lecunga draining the western portion; the portions west of that being drained by the Macuse River or its affluents.

"Of the above the Tjunga and the Macuse are entered by ships up to 1,000 or 1,200 tons. The Lecunga, the Mahela, and the Rarraga are meantime blind rivers, *i.e.*, not open to the ocean; the latter would require a canal opened at the entrance to allow shipment of timber, etc., but is navigable inside for 14 to 16 kilometres, and has splendid forest.

"*Transport Difficulties.*—Meantime transport is excessively bad, owing to the swamp district between the Lecunga and Maqueval.

"Toward the coast there is waterway from the railway terminus at Maqueval via Macuse and Maali Rivers and a short canal to Maroda,—that canal is being continued some seven miles to join the Puada River, which flows into Lecunga and that again by a small cross river connects with the Mabela, one of the affluents of which, the Errin, is navigable to near Arenga, and within a few miles of the Rarraga.

"It is thus possible that on the completion of the canal mentioned, barge transport may be carried on by a slow and circuitous route from the centre of the district to Maqueval, and thence by the 20 miles of railway to Quelimane. But it seems to me that Tjunga is the natural port for the district, and that Bijon should be looked upon as the future shipping centre of the greater portion if not the whole of the area.

"It is central and direct, dispensing with the slow barge work, the repeated handling, and the railway.

"The whole country is one forest, nowhere heavy forest, but in many places, especially along the Rarraga and other rivers, good valuable forest well worth attention for its timber exists, while the poorer parts contain innumerable mine props of first-rate quality and all sizes except very large.

"The native population is fairly dense in the better forest parts; in the North-Western portions I saw very few inhabitants; indeed they seem to have moved out when road-making became a duty.

"*Scanty Population.*—There are no European inhabitants except officials and almost no banyans. Although the occupation is quite recent the district has, however, had some kind of occupation for a long time, one Bonifacio having settled at Arenga about 50 years ago, and built a good house of local material, which is still the Administrator's house and in good order; and he was so far countenanced by Government that he was supplied with two large guns which now adorn the doorway, pointing to the centre of the earth. The district is well supplied with game, and is not clear of large vermin, especially in the west and north, while the fresh rivers are full of crocodiles and hippopotami.

"The altitude at Arenga is possibly 400 feet at about twenty miles from the sea; the site is good, the water supply is good, and beautiful old trees preserved in former days, as well as alien trees then introduced exceed in size any in the forest.

"But here the cocoa-nut is out of its element, as indeed it also is at Bijon, though not so much so. Cocoa-nut culture must be confined to the suitable localities toward the coast, localities either naturally suitable or made so, as the neighbouring Boror Company is doing on its property meantime by the formation of deep ditches, at the rate of about a mile a day.

"This is the use sooner or later of the coast portions which are too wet to carry forest,—alluvial flats, requiring only to be cleared of surface water.

"In the forest and along the rivers there are several fine sites for sugar farms ; one is around Lake Rarraga, and there are others. For the rest the soil is a light sandy loam or of a gritty nature,—often quartzite, enriched by the forest-humus and carrying good crops, and reverting into forest as soon as it gets an opportunity. The mechanical condition is good, and it does not become waterlogged, except perhaps in a few small flats.

"*The Future.*—Now about the future of this country. It is not, like the M'Chopes, a district which can with advantage be maintained as a native reserve. Unlike the M'Chopes, these natives are destitute of every good quality, and centuries of protection would not make them into independent, industrious, and thrifty inhabitants. They must be utilized in daily labour and given daily food ; they will not employ themselves even in agriculture for themselves and they cannot lay in a store.

"Even as a recruiting ground for the Transvaal, while there is no doubt but that employment there is an education to them, and does them immense benefit, still, the smallness of the total population, their inherent lack of stamina, and their undue liability to die in the more rigorous climate of the Transvaal, all indicate that local employment is to their benefit as well as to that of the Province. To my mind the resources, the means of transport, and the possibilities of the district all indicate that it is only suitable for working by one or more large companies ; companies strong enough to handle all transport difficulties, both on land and sea, to utilise the forest without wasting it, to cultivate wherever cultivation is practicable, to render practicable for cultivation what is not so now, and prepared to take in hand the various products which the various soils and conditions render suitable from time to time, and erect and work the machinery necessary for the fulfilment of this programme, as well as to wait for the results.

"The valuable development work put in by all the neighbouring companies already in existence leads to the belief that the extension of one of these, or the formation of another similar company would do the same here ; the conditions are all suitable, all that is required is money and brains.

"Division of the same area into small farms or even into comparatively small companies is to court failure, as no one in that case could or would overcome the initial difficulties, although it is quite practicable, once a large company has taken the matter up and settled transport, etc., that smaller holders may then take up say, sugar estates or fibre estates, under tenancy to the other, and prove successful.

"In regard to the crops for which the district is suitable, it must be taken in portions.

"The coast and for several miles inland suits cocoanuts, manioc, mealies (sown April), mapira, rice and arrowroot, in accordance with the locality and season ; several sites there and further inland are suitable for sugar estates. Citrus trees grow to perfection, and there is no reason why large fruit farms here should not supply the English and other European markets a month before the Natal supply begins and while the European markets are still empty, and good prices prevail. Tropical fruits which meantime do not go to Europe but which carry fairly well, the pawpaw, avocado pear, mango, litchi, etc., also deserve attention for that purpose, if transport service is good.

"*Suitable Crops.*—Sisal is suitable almost everywhere, so also kapok, which can be planted between the sisal to come into bearing as the first rotation of the other goes off.

"Earthnuts and sesame as annual crops suit almost all localities there, while with mapira, manioc and mealies, together with sweet potatoes and yams for local use, there is no reason why there should be empty ground or small profits.

"Meantime earthnuts find their way from the most remote parts of the district to Marseilles, and the available area for their cultivation is the whole district, while in regard to sesame an experimental culture of this has resulted in about a thousand muids now lying in Quelimane.

"Beans can also be grown for shipment and for use throughout South Africa, wherever transport is available, enriching the soil at the same time. Under some conditions of labour the culture of castor-oil beans (*Ricinus*) may also be practicable, though I think the culture of the previously mentioned products should be considered first.

"Whether rubber and cocoa can be cultivated with advantage remains to be proved ; both are being experimented with meantime. Probably castilloa rubber may be found suitable although so far the oldest plantation of several thousands is only two years old and three feet high,—quite a satisfactory growth ; ceara rubber will grow to perfection in many localities, but its profitable culture even there has still to be shown. Indigenous *Landolphia* rubber exists throughout the district, though not in great abundance and the rubber from a small tree growing along the rivers is purchased by the Banyans at an equal value.

"*Cotton and Fibre.*—Cotton will grow throughout the district, in the upper as well as in the lower portions ; its profitable culture depends on the kind used, the season, the labour supply, the cultivation, freedom from insects, and transport ; and its culture should not be abandoned if the first or even several experiments are not quite successful. I think it is quite practicable to grow cotton in the lower districts to advantage ; the upper districts did not appear to me to have the population to handle it meantime.

"Another fibre in addition to sisal (and *Furcraea*) deserves serious consideration, viz., New Zealand flax (*Phormium tenax*). The moist places which are hardly swamp suit it to perfection ; it grows luxuriantly with leaves 8 to 10 feet in height, produces a large leaf supply, of high fibre value ; it is easily handled, and has now secured a good place in the world's markets. I recommend this for extensive use in moist but not submerged land.

"On the saline banks of the tidal rivers and lagoons the various mangroves have been cut more or less for their bark during past years, but the export is now prohibited

owing to the practical exhaustion of the supply, and the danger of clearing out what seeding trees remain. I think action should go further, as very large areas are meantime practically cleared of everything except the white mangrove (useless for this purpose), and I think these should be stocked with seed of the red mangrove, even at considerable cost, with a view to a large future revenue. No tree costs so little for preparation of land or for planting; it is of rapid growth, and its propagation would replace a product of little value by one in demand.

*"A Light Tramway required.*—A light tramway from Bijon to Arenga (say 50 miles) with feeders along the ridges, and worked by native labour only, consequently requiring little ballasting and light bridges, appears to me to be the method by which this district can be opened up, as that affords a means of removing timber and other produce with light works, and without imposing a prohibitive cost.

"The trees and timbers will be dealt with in a separate report; suffice it meantime to say that they are worth a better fate than to be burned out, and should be a source of wealth to the province. The district will some day be one of the large producing districts of the world; when that time will come will depend on the action taken now or soon in regard to opening the district for industrial purposes, and to me it appears that that development should be taken in hand at once.

"I have to express my thanks to the Administrator, Snr. Milicia, for having personally shown me over his district, visiting with me Maquerine, Arenga, Bijon, Maquebella, Mulvalla, Mnjeba and Macuba, each about 50 miles distant from the next.

"From Macuba I returned through Nhemacurra to Maqueval and Quclimane, visiting at Nhemacurra the beautiful sugar plantations of Messrs. Helliard and Heimburger and at Malinguine the vigorous young sisal plantation of the Boror Company, where next year harvesting will begin."

#### FURTHER RECOMMENDATIONS.

The riches of the Province at present lie in its native population, in its forests, and in its land; rich alluvial in places, light and sandy in others. How best to utilize these is the problem. The three are co-operative, their development must proceed jointly. I have already expressed my grave doubt as to the wisdom of shipping out the bone and muscle, the strength and sinew, of the Province, in return for cash, especially while they are urgently wanted for local development. The argument is urged:—"Can the Province afford to do without the cash?" My reply is that these same men, if doing an equal amount of agricultural work within the Province as they do of mining work in the Transvaal, would produce an export of grain, oil, rubber, sugar, fibre, &c., greater in value than the money brought into the Province directly or indirectly through the migration of these men. Not only so, but these operations would require as concomitants, internal development, European supervision, increased shipping, railway promotion, factory construction and the many other changes which aid in reducing an almost unexplored native reserve into a self-supporting, government-supporting and highly productive territory. The Zambesian districts require population rather than its depletion, and though the M'Chopes is well and happily populated there is room for ten times the number of producers if the district had a railway to move the produce.

The development of the land in so far as the alluvial valleys are concerned is a matter for the European with his steam plough, steam harrow, mechanical cultivation, up-to-date machinery, mixed irrigation and dry farming, tram lines, steam boats, and general control of the situation. If to this is added a bonus on production, as happens meantime in regard to sugar, success is almost assured, if reasonable sea freight and reasonable coast shipping charges are in force. Meantime conditions of shipment would stand revision, and in regard to this as well as to timber and other industries it is necessary that producers or owners be allowed to ship in their own or hired transport if so inclined, without any undue handicap. The cost and restrictions on coast transport are meantime the preventives to advance in agricultural development. In the alluvial valleys, in so far as they are tree-clad, these trees must give place to more systematic and profitable crops, but that is no reason why they should be wasted or burned, as so often happens. The same holds good in regard to much of the higher, drier, and more sandy land. This land, like the alluvial, is suited for agricultural cultivation; to allow it to be so utilised it must be cleared first, and on purpose to clear it there is no reason why the forest produce should be burned. Whether in the northern or southern, the tropical or the extra-tropical districts, the cost of shipping direct to Europe or to South Africa is pretty much alike, and with the exception of Lourenço Marques no district has special advantage, except such as has its own port. Taking the Transvaal price for mining props 8-10-12-14 inches in diameter (about £2 per ton in Johannesburg) as a basis, and allowing that handling and freight cost £1 per ton between Lourenço Marques harbour and Johannesburg, it follows that any profit to be derived from such transactions has to be made out of a price of £1 per ton in Lourenço Marques. Whether or not timber can be felled in the M'Chopes or Zambesia, and delivered with profit at Lourenço Marques at that price depends on the management and freedom of trade; similar action can be done with a large margin of profit in other parts of the world and with large and energetic companies and no restriction, it can be done here too. It remains for Government to decide whether these forests shall be turned to account in the internal development of the



Province, or gradually burned out. There is an enormous value, both in hardwoods and in softwoods, within the Province; it will gradually be burned out to make way for cultivation unless utilised as occupation is in progress, and it can only be utilised if conditions allow of its being delivered at about the rate mentioned. Of course, among it is much valuable timber fit for export to Europe for furniture and hardwood purposes at a much higher rate than that mentioned for mining timber, and this may assist to bring up the general average value, but the most important factor is that the Transvaal can be relied to take all hardwood props between 8 and 14 inches diameter in so far as they are not too valuable for that purpose. The soft woods on the other hand are not in demand except as plain and grooved flooring-boards, ceiling-boards, &c., and until local factories are erected for making them so, any trees felled are practically wasted.

I have already indicated that unless Government is itself prepared to undertake huge development schemes, and sufficiently free from Home control and sufficiently permanent in its policy to guarantee stability to any work undertaken, the path to progress lies in the direction of Development Companies, granted concessions or occupation under such favourable and permanent agreements as will allow them to spend money freely with some reasonable prospect of a good return. Any such Company has to overcome innumerable and unforeseen difficulties and must have a talented local manager as well as an enterprising board, but given the right manager, the right board, and the right capital, few areas in the world have now such opportunities of development as Magenja da Costa. With timber upon it to pay for its own clearing and cultivation, produce sleepers for local use, and leave a cash surplus; with fairly abundant and exceedingly cheap labour; with numerous waterways and several ports; with gradients that allow tramway service everywhere, with soil everywhere which will carry some crop saleable for export as well as for local consumption, and with a present land value sufficiently low to tempt anybody, the surprise is that the Government has not been pestered with applications from speculative financiers as to terms on which huge concessions could be taken up. It is only ignorance of the actual value, especially of the timber, which allows this to be the case.

But if, on the other hand, no scheme is adopted, either by Government or by Concessionaire Companies, destruction will go on, followed up by fire and weeds, no return will be drawn from the forest while it is being destroyed, and the land will be left in a condition more difficult and costly to handle than before. The district includes its cocoa-nut belt, its sugar valleys, its sisal fields, its half-swamps fit for rice or New Zealand flax, and its huge area of rolling dry lands fit for mapira, mealies, cassava, dohl, sesame, m-dumbes, pea-nuts, earth-nuts, sweet potatoes, beans, pine-apples, tropical fruits, cotton, coffee, tobacco, and probably also jute, cocoa, rubber, and palm oil (*Elaeis guineensis*). How many more products can be grown with advantage remains to be seen, but all the above kinds can be introduced more satisfactorily, at less cost and with more profit as soon as the forest is cleared than after a mixed regrowth of weeds.

For the development of this and other districts better transport is absolutely necessary; tram service is the one solution to this problem, and the utilization of the timber in sleepers and in traffic is the only present means of laying down tram lines inexpensively, each truck carrying out rails returning with timber as the work proceeds. Considering the difference in cost of construction between a line laid for steam power and one laid for hand power, and the abundance and low cost of labour, the latter method appears to me to be preferable, especially as it can so much more easily be moved from one locality to another as clearing proceeds. Such a line through any district at once allows each man employed to transport on every journey many times the amount of produce he could previously carry. If oil nuts can be carried by hand one to two hundred miles to the coast for shipment, as I saw being done, then the culture would be comparatively remunerative with such improved transport, while the owners of the line would have a substantial return. I know that there is prejudice against anything less than steam power, and for a main line would not advocate such, but what is wanted here is not so much a permanent line as a light development line which can be moved from valley to valley, and from ridge to ridge as clearing proceeds, maintaining however a through service for agricultural produce wherever that is required. Such lines handle all the produce of the sugar estates to the mills; such lines have answered all purposes on the very extensive sugar plantations of Natal; and such lines meet the present requirement of this Province.

Though this is written in connection with Zambesia it applies with equal force to other parts of the Province. A through line from the main line to the Limpopo, and thence to the Inharreme and Inhambane, is urgently wanted to connect up these waterways with the sea and with the railway, but until such can be taken in hand, a tram service, as described above, connecting M'Chopes and Inharreme with one or other of the ports is an immediate necessity.

Together with improved transport, local manufacture is a desideratum. Whether owned by Government or by private owners, sugar-mills, oil factories, grinding mills and sawmills are necessary. Central mills owned by Government, and each serving the producing public of its district, best answers the purpose, unless where a strong company has the local development in hand, and there replaces the Government in that respect. The reduction of bulk and weight before transport is the first element in economy, consequently all waste materials and by-products, which cannot be realised with profit, should be dismissed before freight commences.

Under the scheme here sketched, which applies with equal force to almost any locality, the men, instead of being shipped out are retained in the Province for local development; the forest produce instead of being burned out pays the cost of clearing and development, with something over; and the land becomes available as a huge producing area of first quality and with transport carefully arranged. This is no idealist's fancy; it is all practical and practicable.

A few more points remain. The collection of hut-tax in rubber where cash is not available; the purchase of rubber and other produce at tariff rate by every Administrador so as to protect the native from the wily Banyan; the extensive sowing of Mangrove where White Mangrove now predominates; and the opening up of the Mkaia and other hardwood forests along the main and Swaziland lines under payment of a royalty per ton where loaded on rail; these constitute the further points of action necessary to utilise the forests and forest products to their best advantage.

Whether all these recommendations, if adopted, can be carried out by the departmental staffs as presently constituted, or require the addition of another department or sub-department or of additional officers, is an administrative matter which the exigencies of the public service must decide. The Government is particularly fortunate in such of its officers as I had the opportunity to meet, but it appeared to me that, in regard to the country ones at least, each had already more in hand than one man could well do. The technical work involved in transforming a whole forest district into a productive and remunerative agricultural area covers the whole stretch of science and art, and it is almost too much to expect that officers trained principally to the collection of hut-tax and administration of justice can at once pick up all the threads. The work must proceed gradually in any case, but what is necessary to ensure a good foundation, is the evolution and adoption of such a plan of action as can be taken up piece by piece, partly in one place and partly elsewhere, carried on when funds are available, held in partial suspense when funds are low, but which in every action undertaken works towards one common aim, and finally arrives at the goal it started for.

The whole process may be objected to by some on the ground that it is de-forestation, and that it carries climatic effects in its train. That it is de-forestation in the first case is true, but it is only recommended as clearing for agriculture, and that agriculture may either at once or after a time include afforestation on regular lines and in paying crops. The forest under present circumstances yields practically nothing; selection from it would extract its value and leave an empty skeleton, as has happened in so many other countries; what I recommend is its utilization piece by piece and in such manner that what is cleared must go into other crop, while what is not cleared is left intact. In this way agriculture in places replaces natural forest, the climate may be altered but in the direction of being more healthy, and if any effect on the local rainfall is produced, it can only be after the execution of operations on a larger scale than I can anticipate in the near future.

The Province is full of potential wealth, it only requires careful handling in the extraction of that wealth, to use and not abuse the legacy which nature has so lavishly provided.

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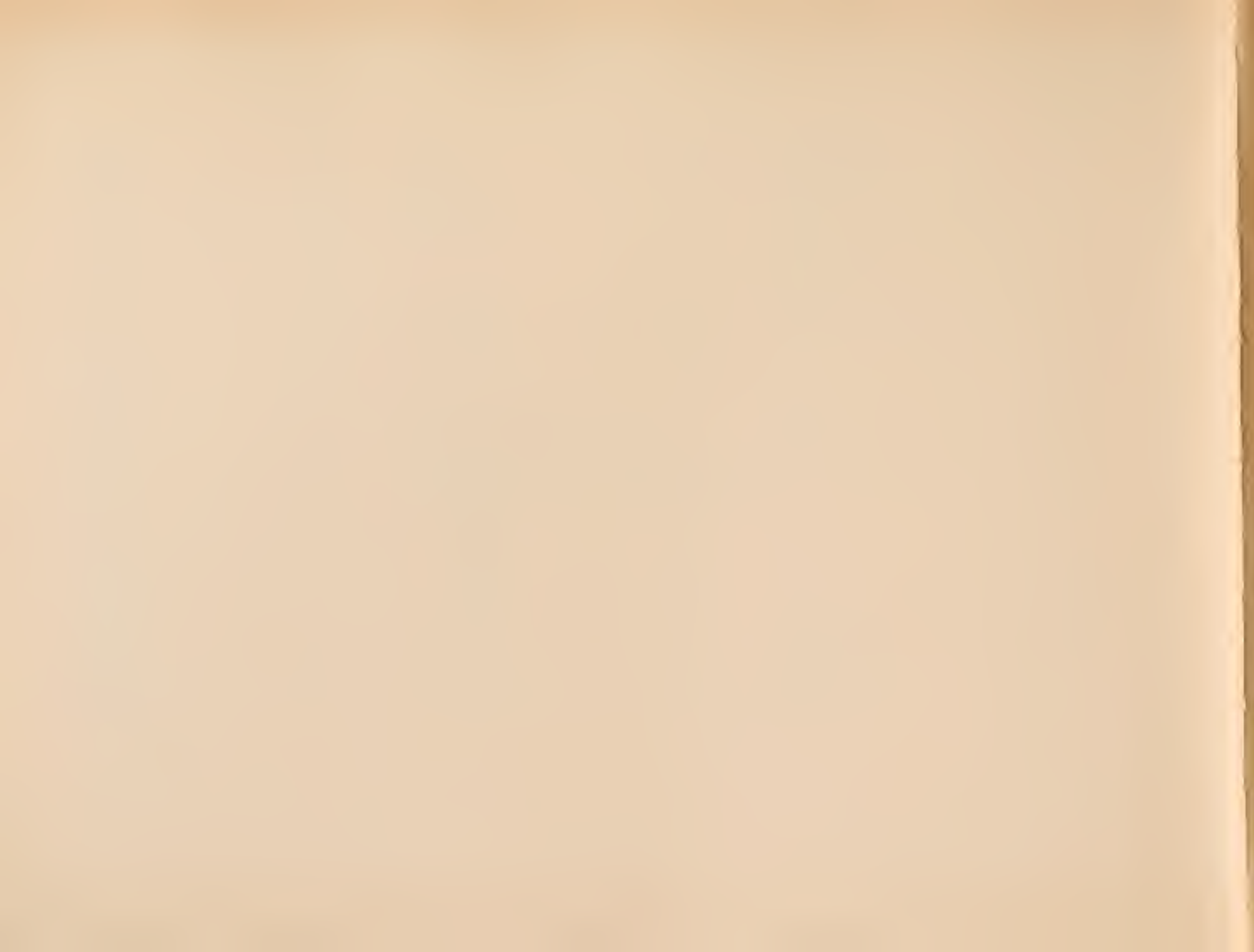
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PART II.

Illustrations of the Species







A. *Anona senegalensis*.

B. *Scolopia Zeyheri*.

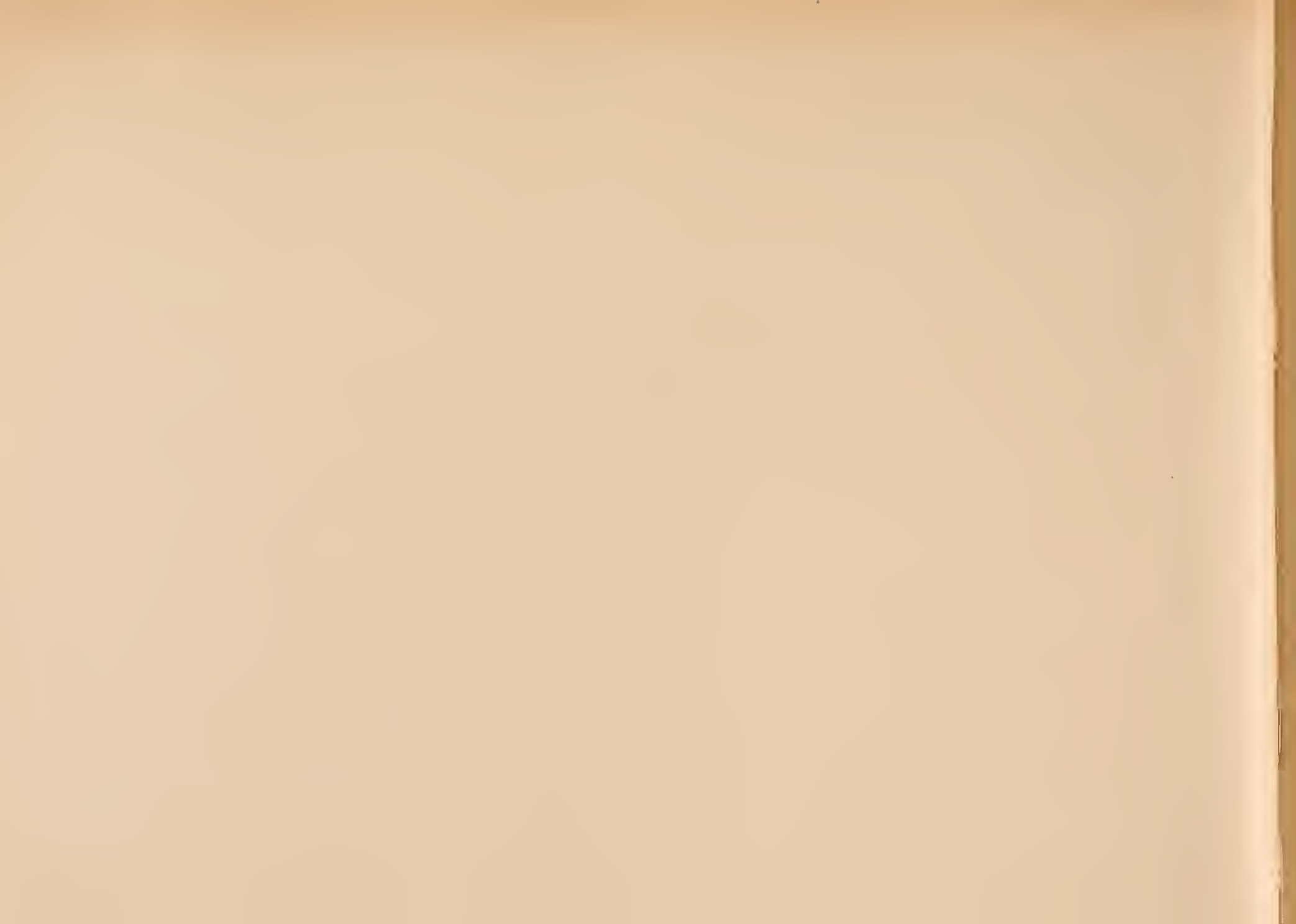






A. *Bixa orellana*.

B. *Oncoba spinosa*.





A. *Capparis albitrunca*.

A.4. *Capparis albitrunca*, var. *parvifolia*.

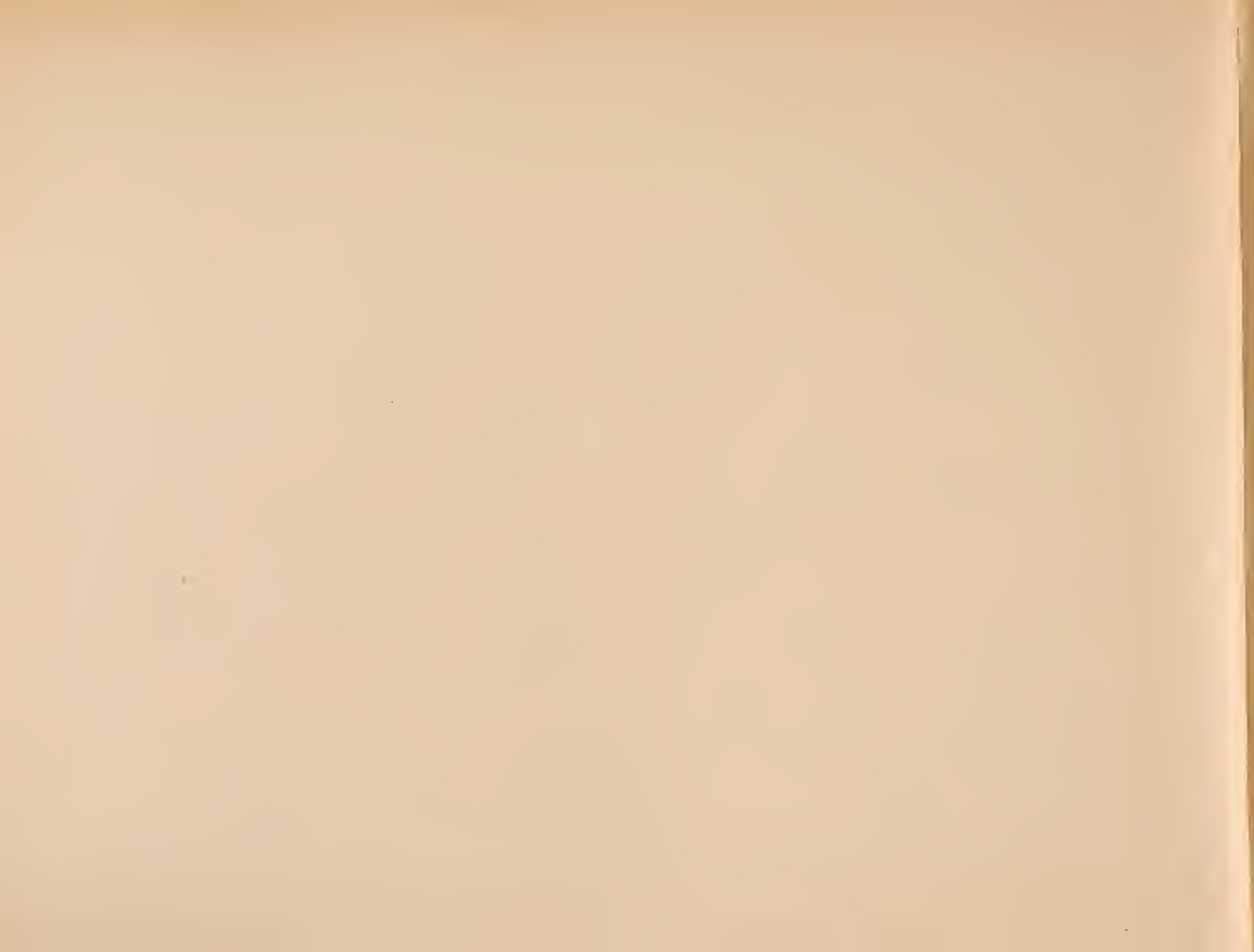
B. *Oncoba sulcata*.

C. *Carpodiptera minor*.





A. *Garcinia Livingstoniana*B. *Ochna arborea*.







A. *Securidaca longipedunculata*.

B. *Securidaca spinosa*.

C. *Diacarpa alata*.





*Sterculia quinqueloba*.





A. *Cola cordifolia*.B. *Sterculia tomentosa*.





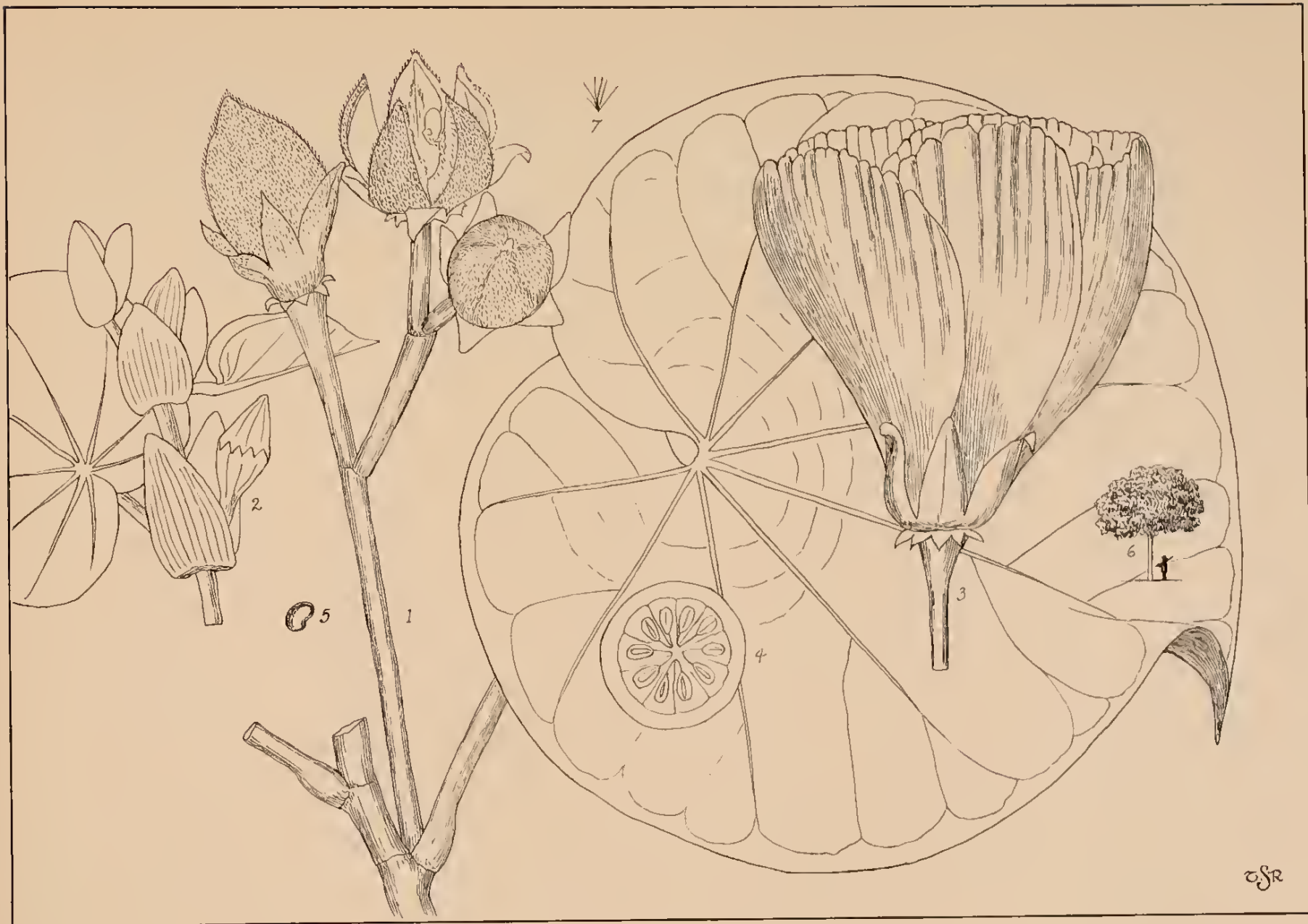


A. *Dombeya spectabilis*.

B. *Dombeya Burgessiae*.

C. *Dombeya multiflora*.

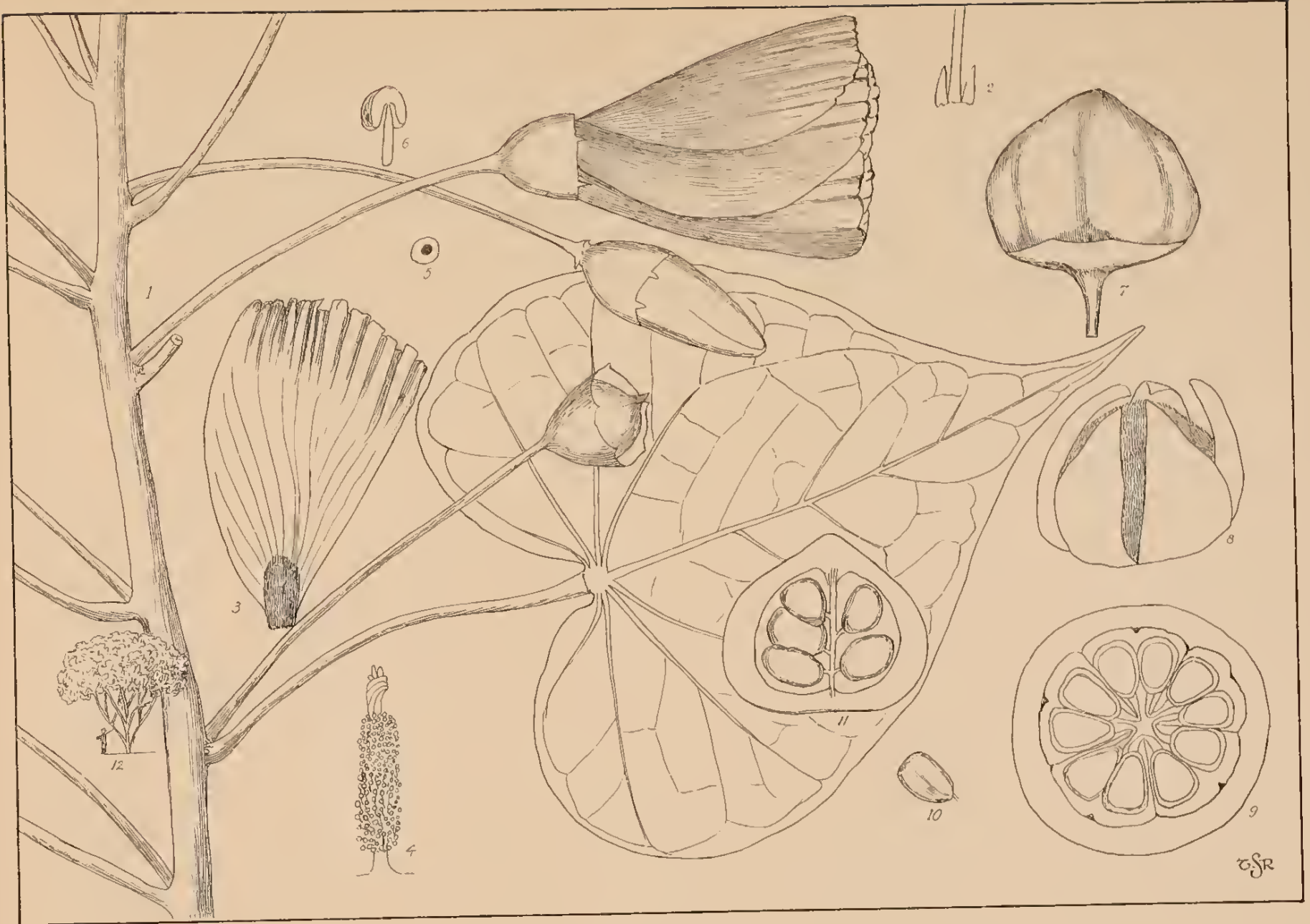




*Hibiscus tiliaceus.*







*Thespesia populnea.*







*Adansonia digitata.*

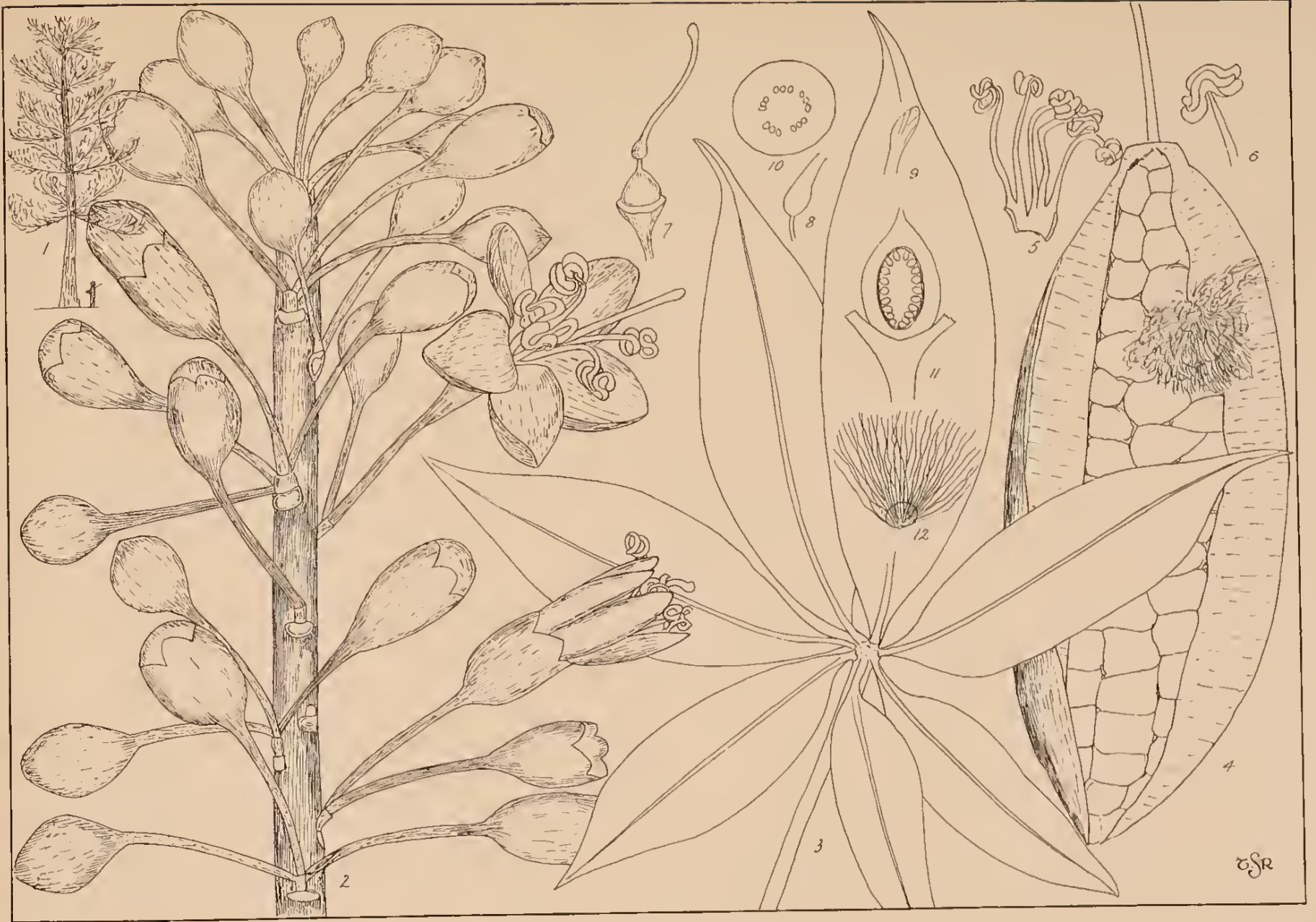




*Bombax Buonopozense.*



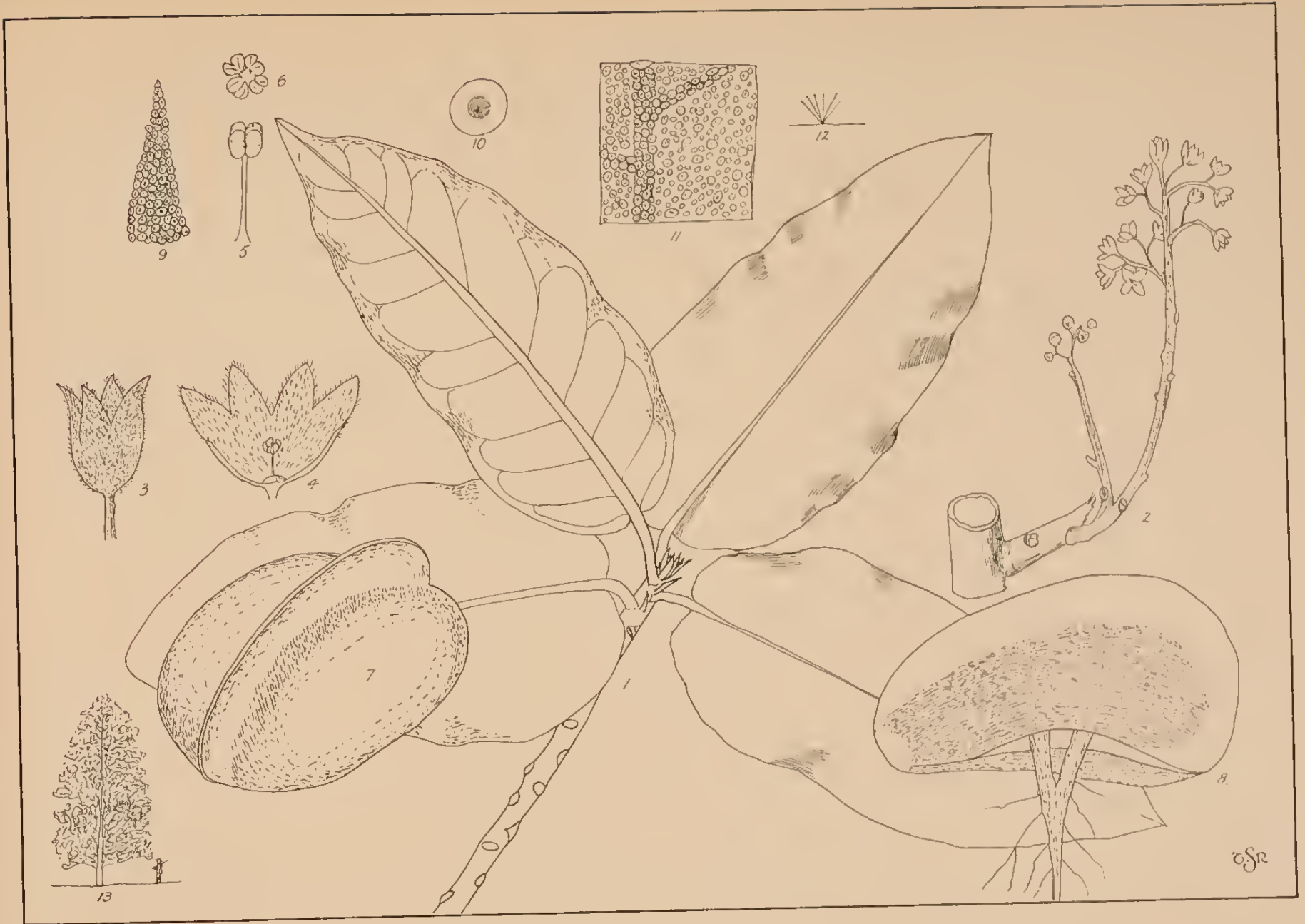




*Eriodendron anfractuosum.*







*Heritiera littoralis.*

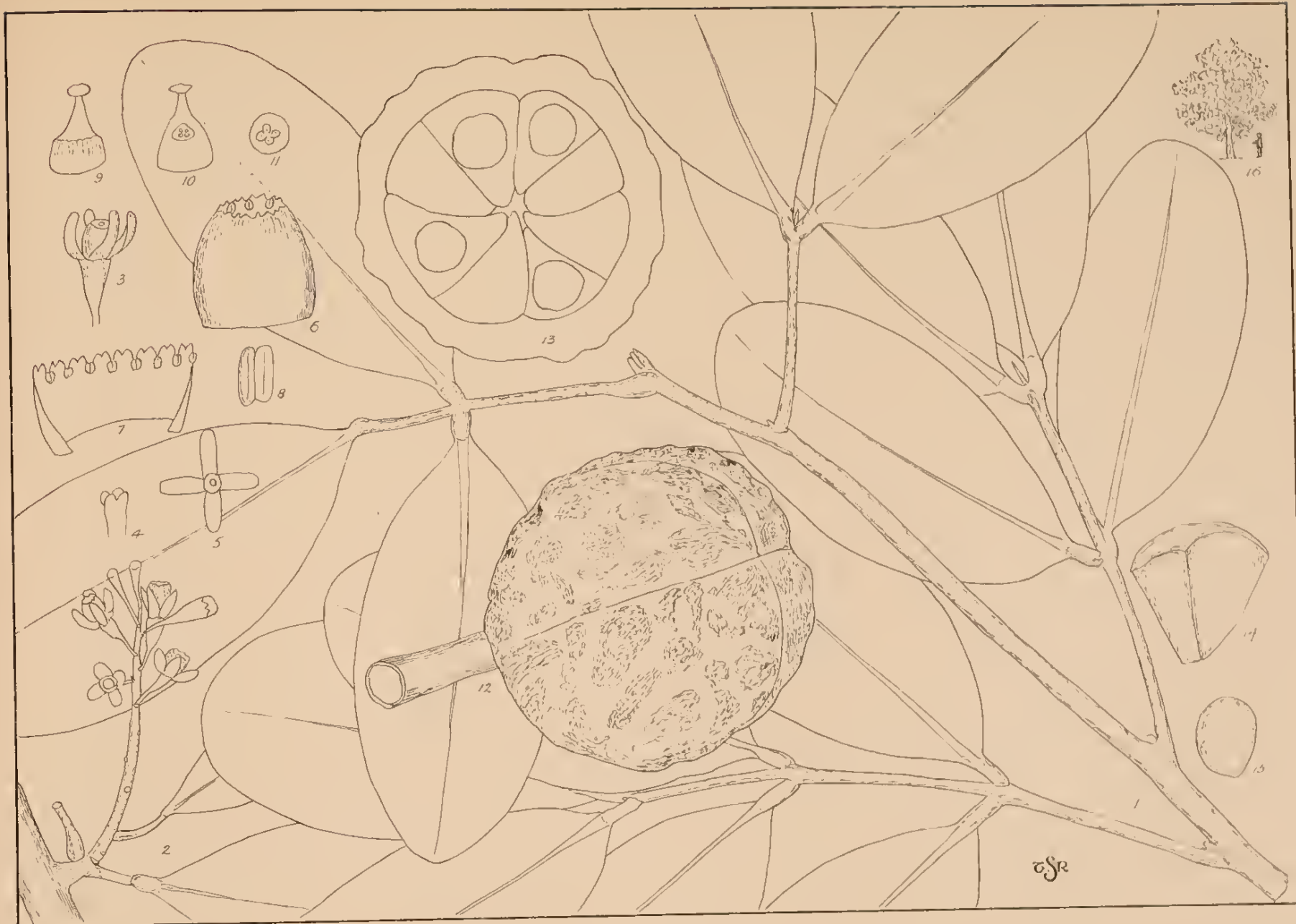




*Trichilia emetica.*







*Carapa moluccensis*.





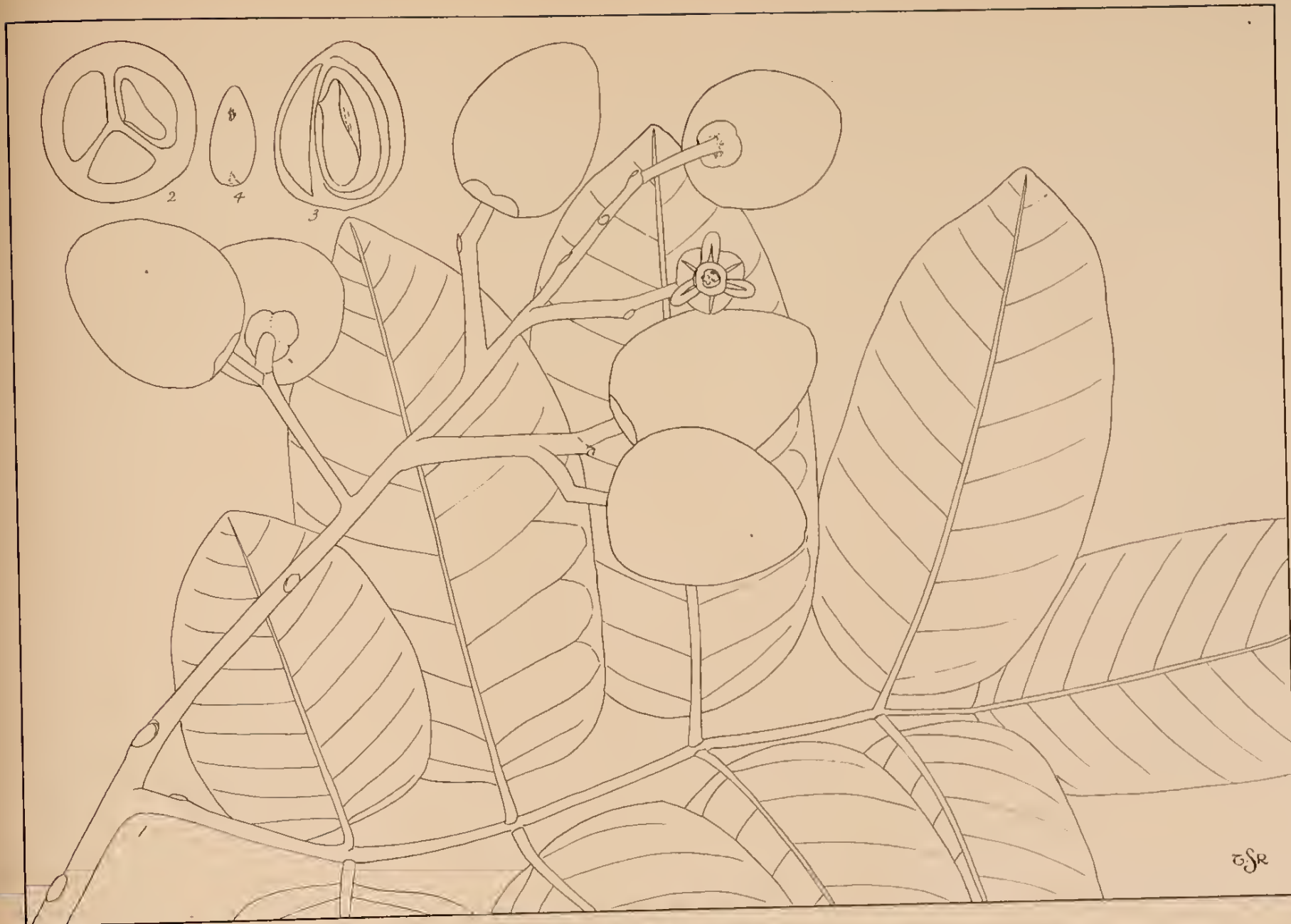
A. *Xanthoxylon capense*.B. *Dovyalis celastroides*.



A. *Turræa nilotica*.B. *Turræa cylindrica*.







*Sorindeia (?) trimera.*







*Ekebergia Meyeri.*

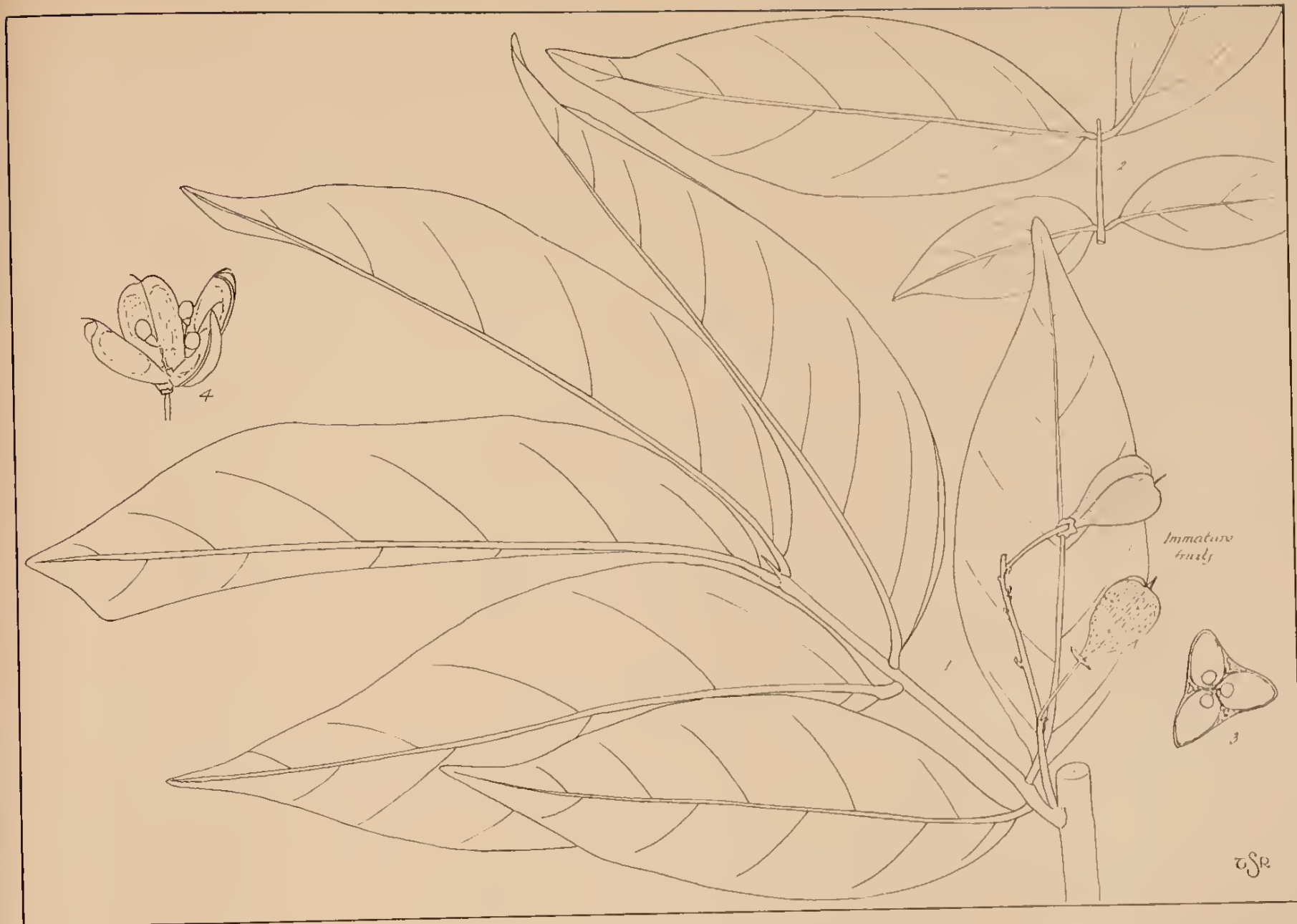




*Khaya senegalensis.*







*Blighia sapida.*







*Bersama mossambicensis*



A. *Zizyphus jujuba*.B. *Zizyphus mucronata*.





A. *Rhamnus Zeyheri*.B. *Suriana maritima*.C. *Toddalia lanceolata*.





*Andradia arborea.*







*Mangifera indica.*

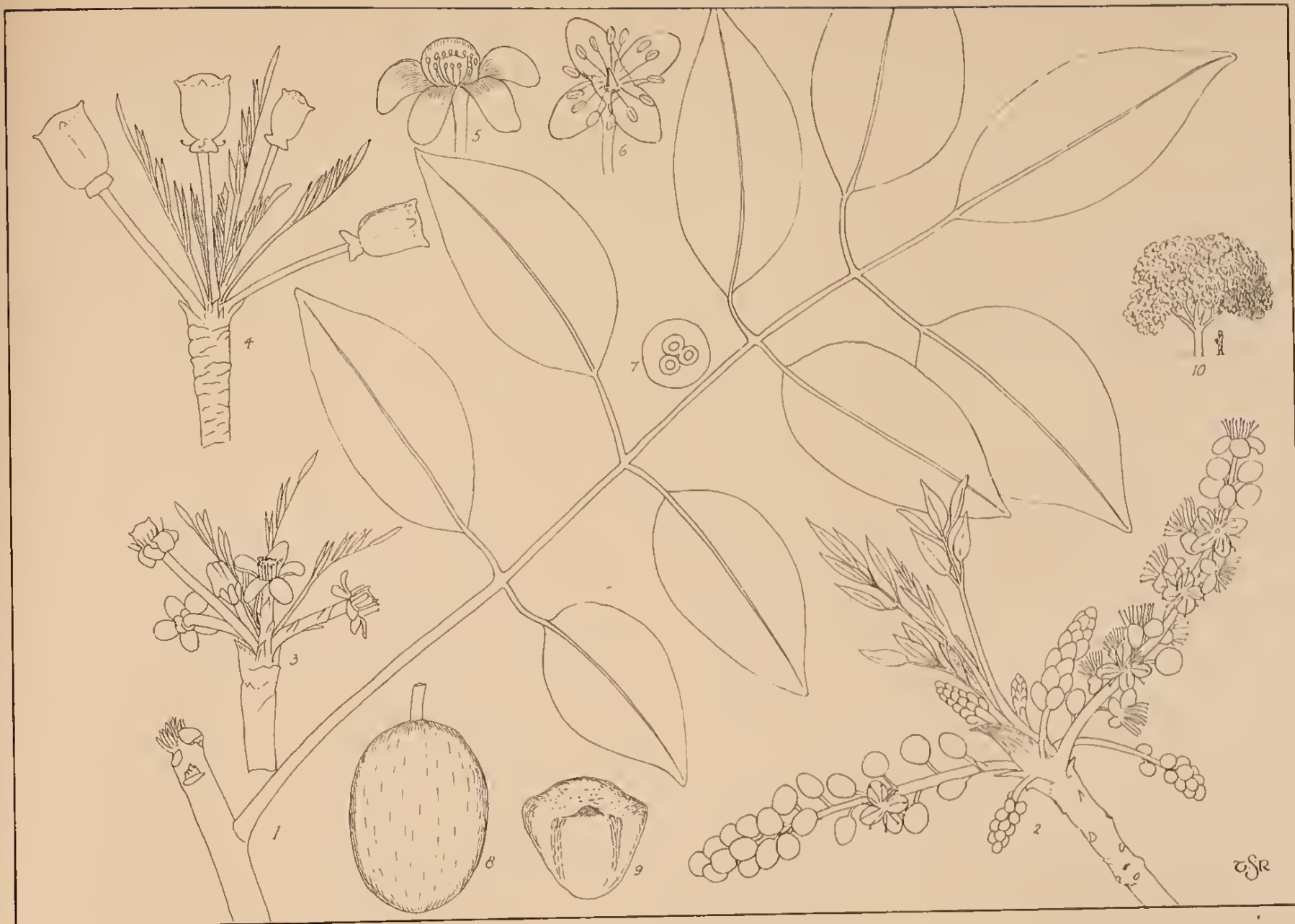




*Anacardium occidentale.*







*Sclerocarya caffra*.





A. *Irvingia mossambicensis*.

B. *Hippocratea delagoensis*.

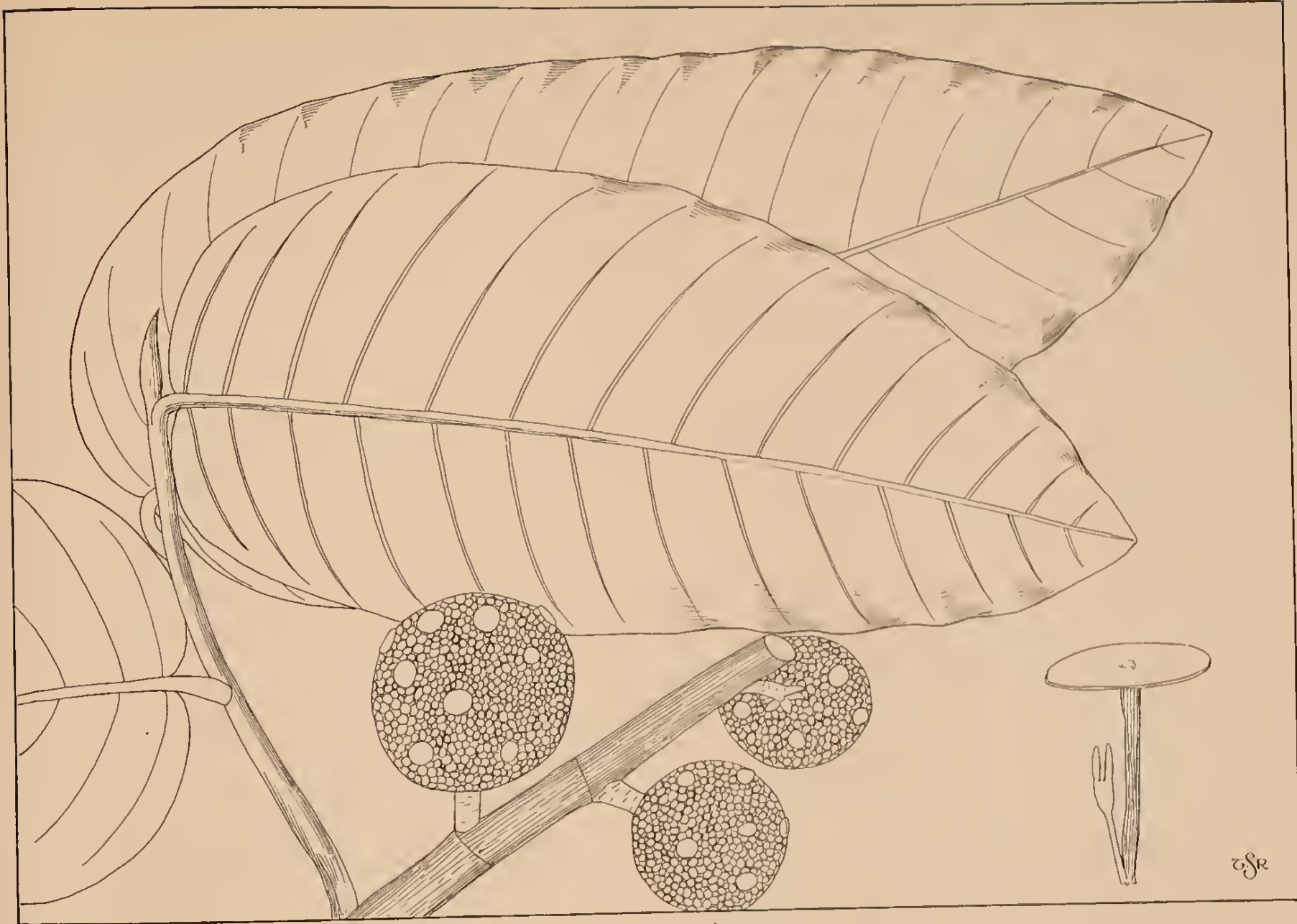






*Adina microcephala.*





*Artocarpus (?) africana.*





A. *Saldania acanthocarpa*.B. *Acacia nigrescens*.



*Acacia albida.*





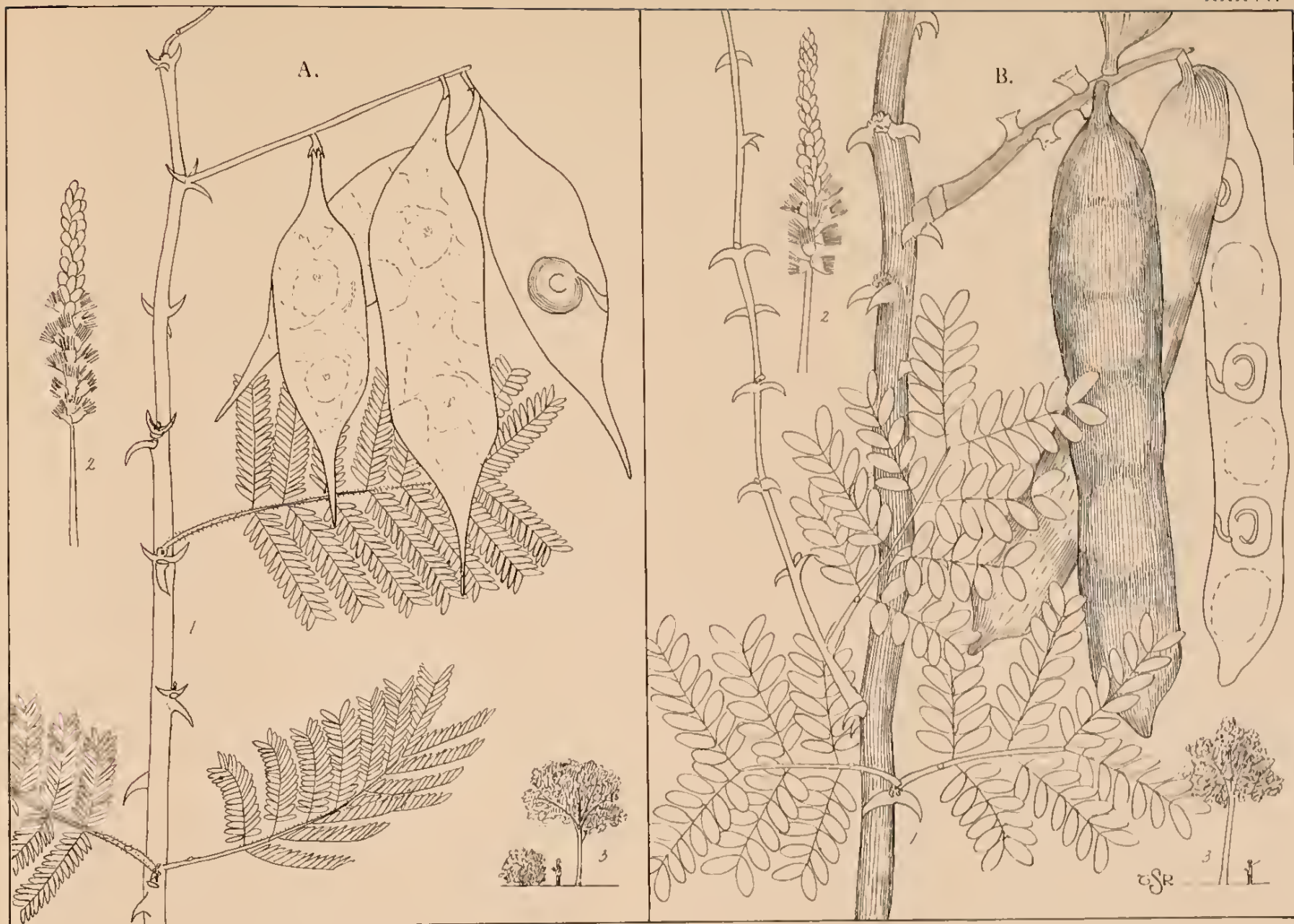
A. *Acacia hirtella*.B. *Acacia seyal*.



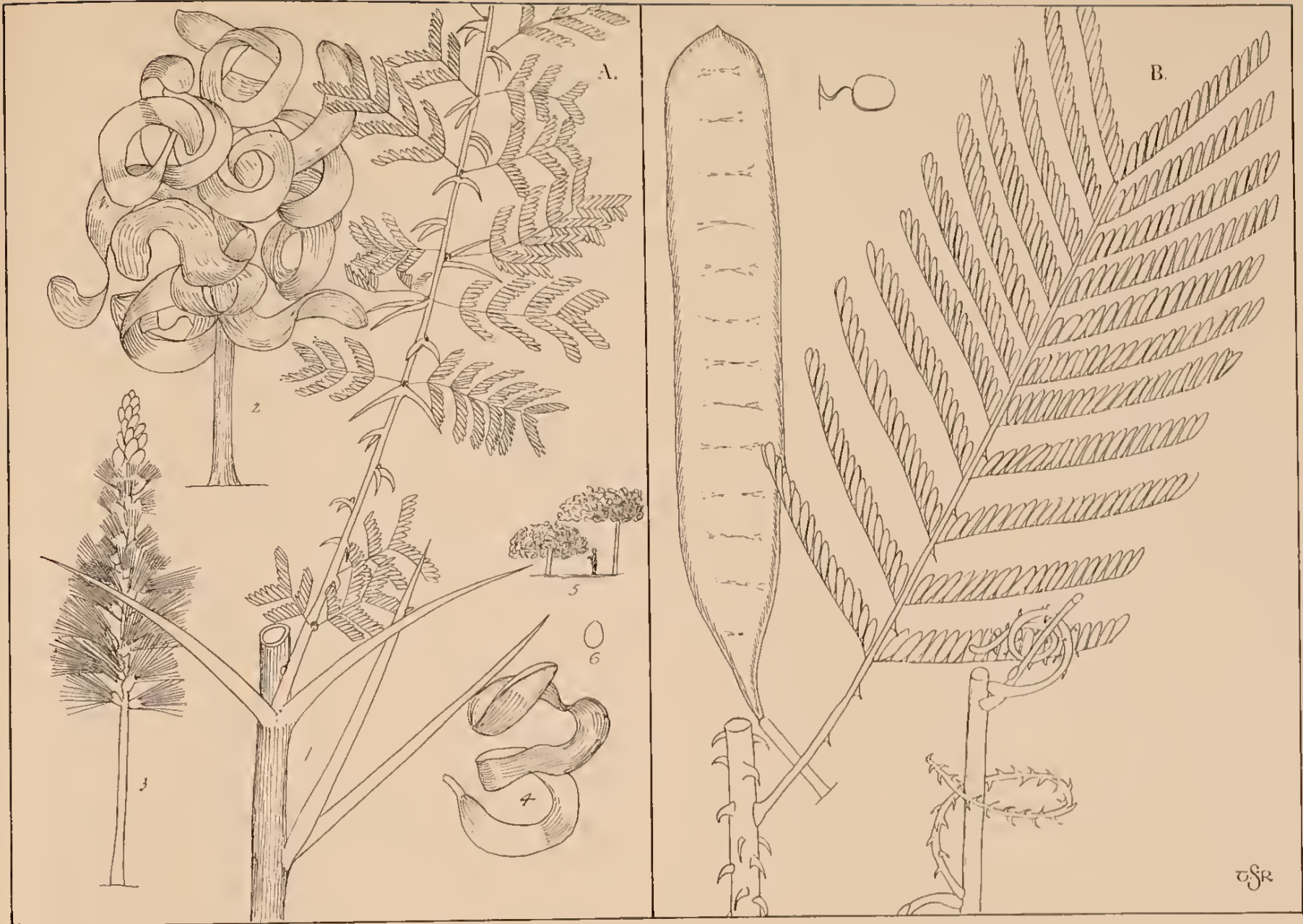
A. *Dichrostachys major*.B. *Acacia arabica*.





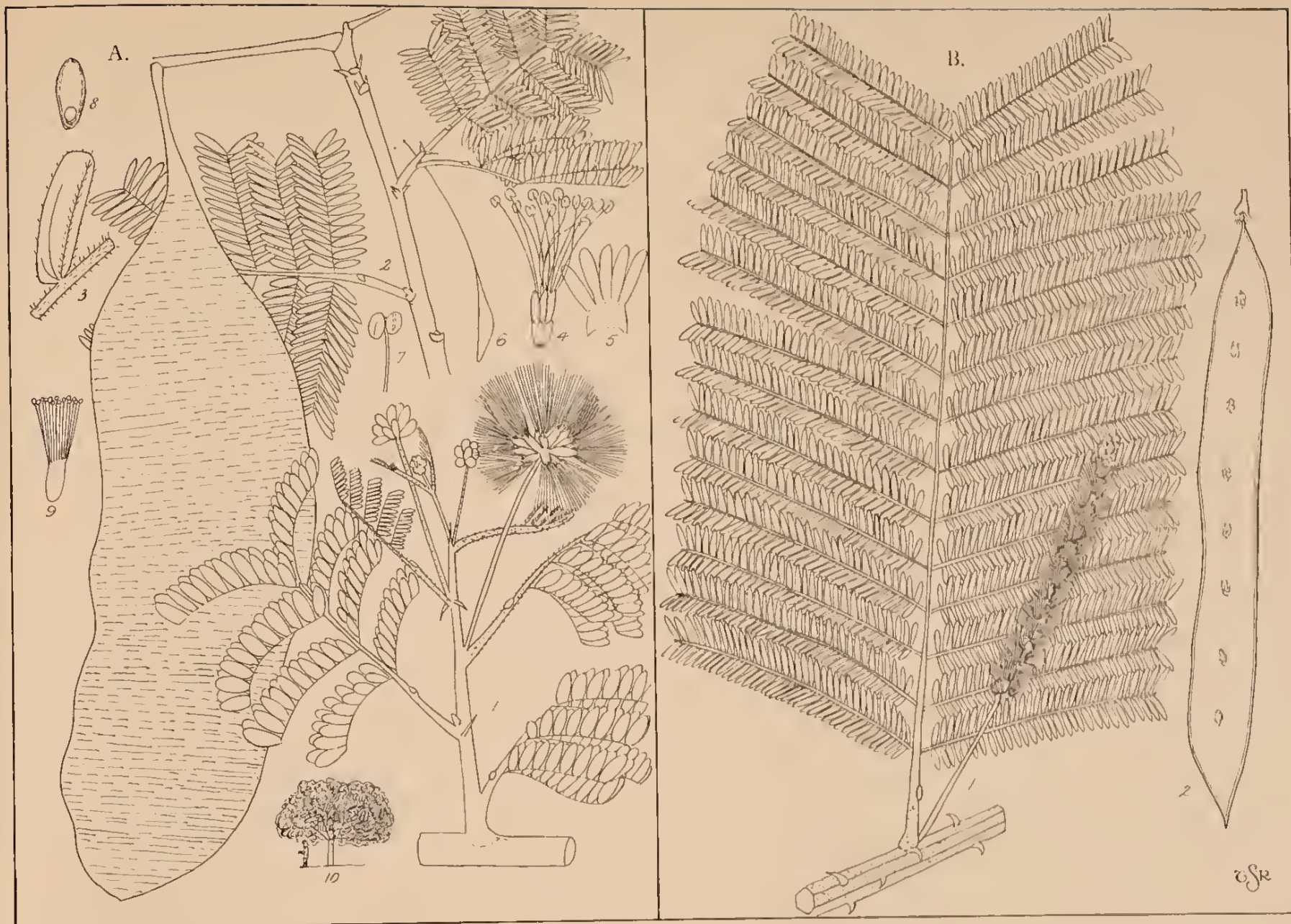
A. *Acacia rostrata*.B. *Acacia Welwitschii*.



A. *Dichrostachys nutans*.B. *Acacia pennata*.





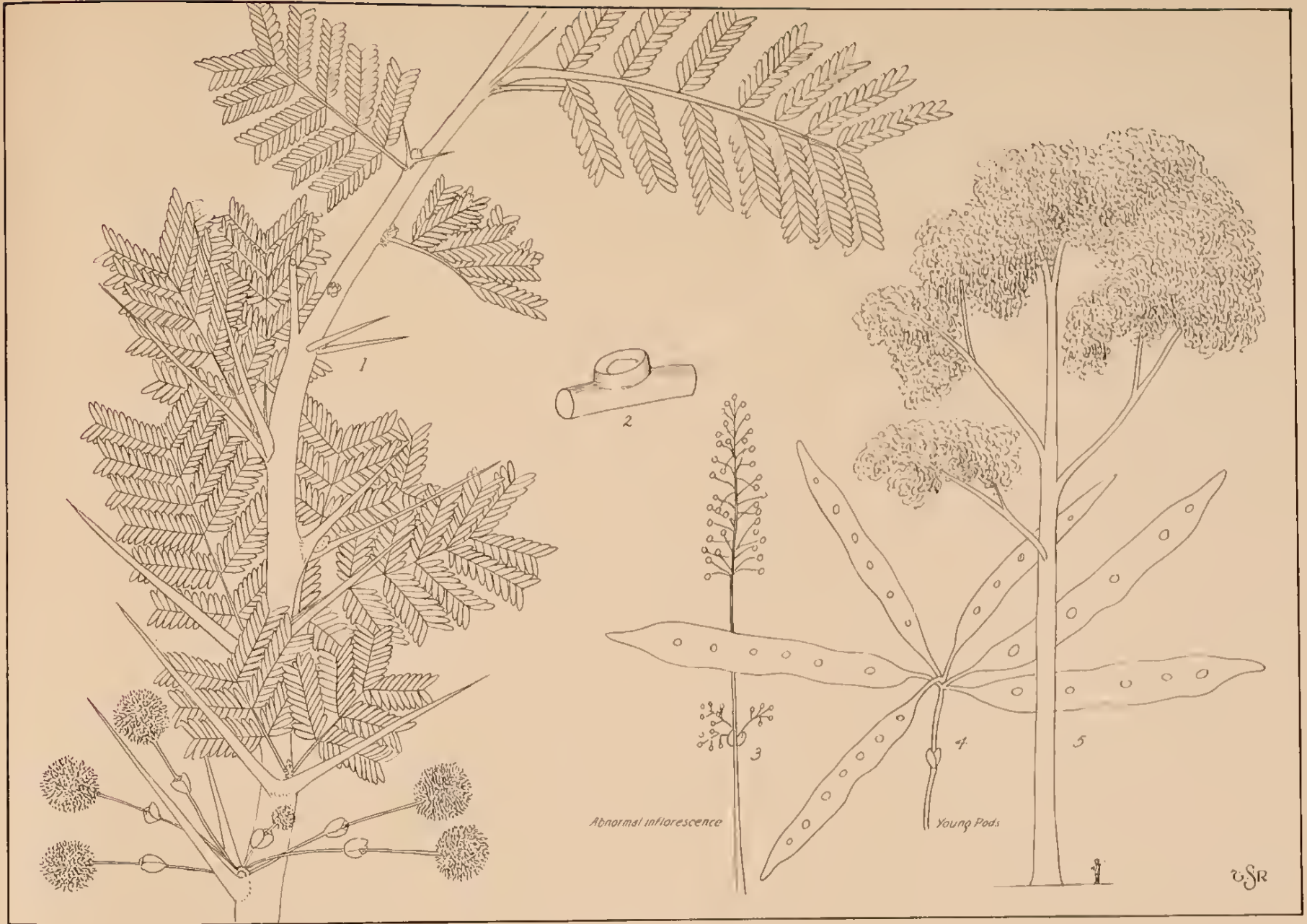
A. *Albizzia Forbesii*.B. *Acacia caffra*, var. *rupestris*.



A. *Acacia retinens*.B. *Acacia glaucophylla*.

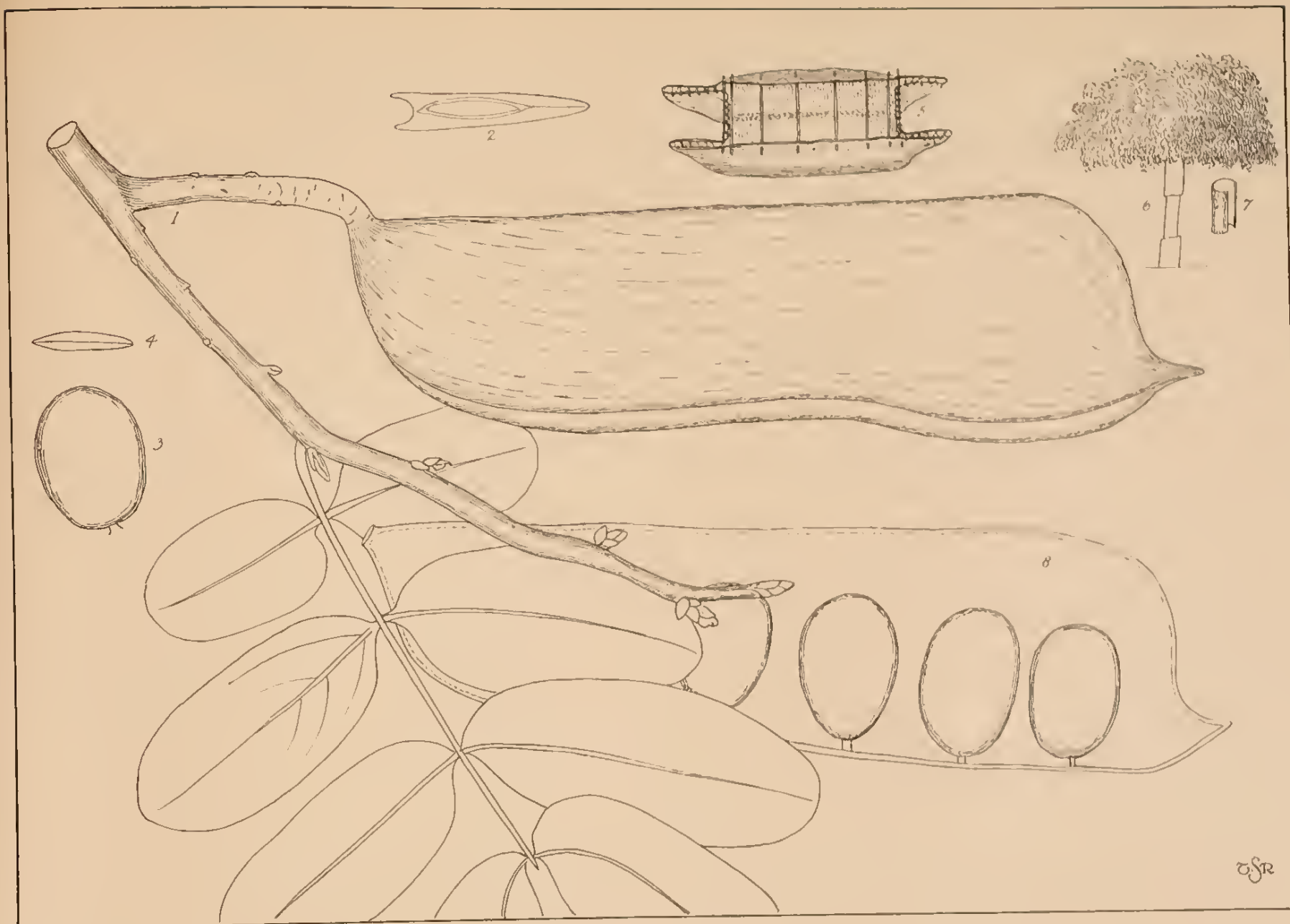






*Acacia xanthophloea.*





*Brachystegia spicæformis.*







*Bauhinia reticulata.*

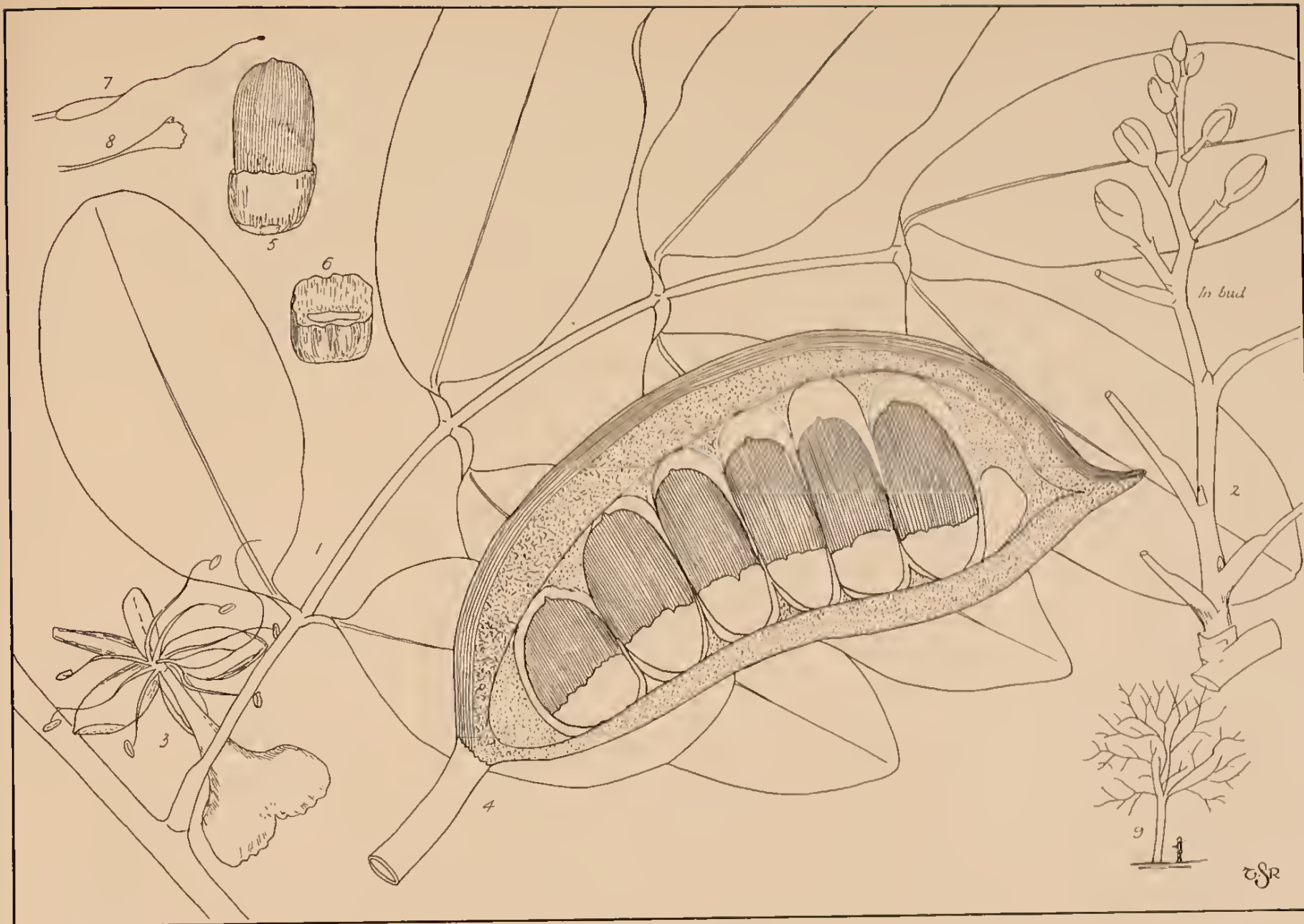




*Parkia filicoidea.*

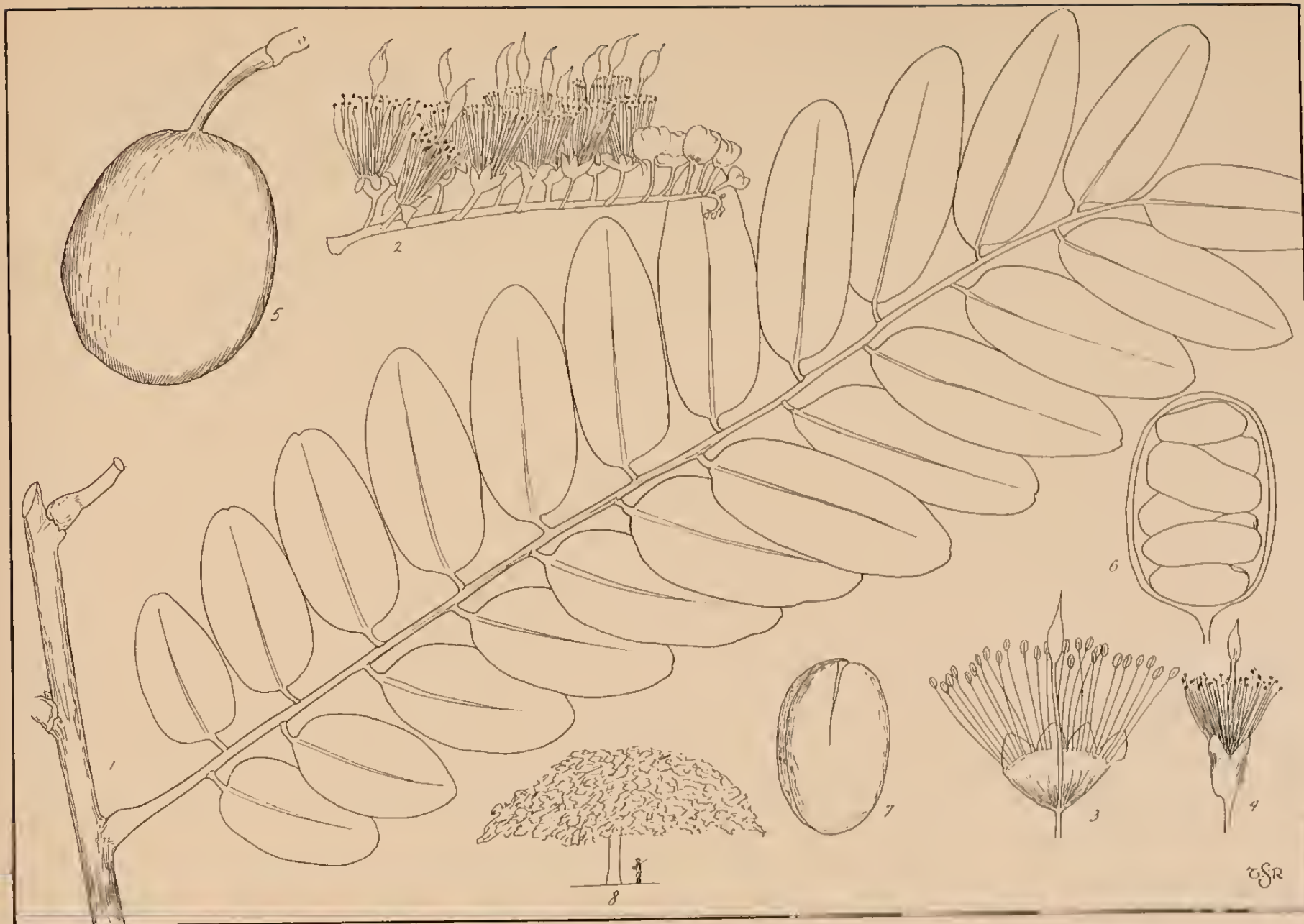






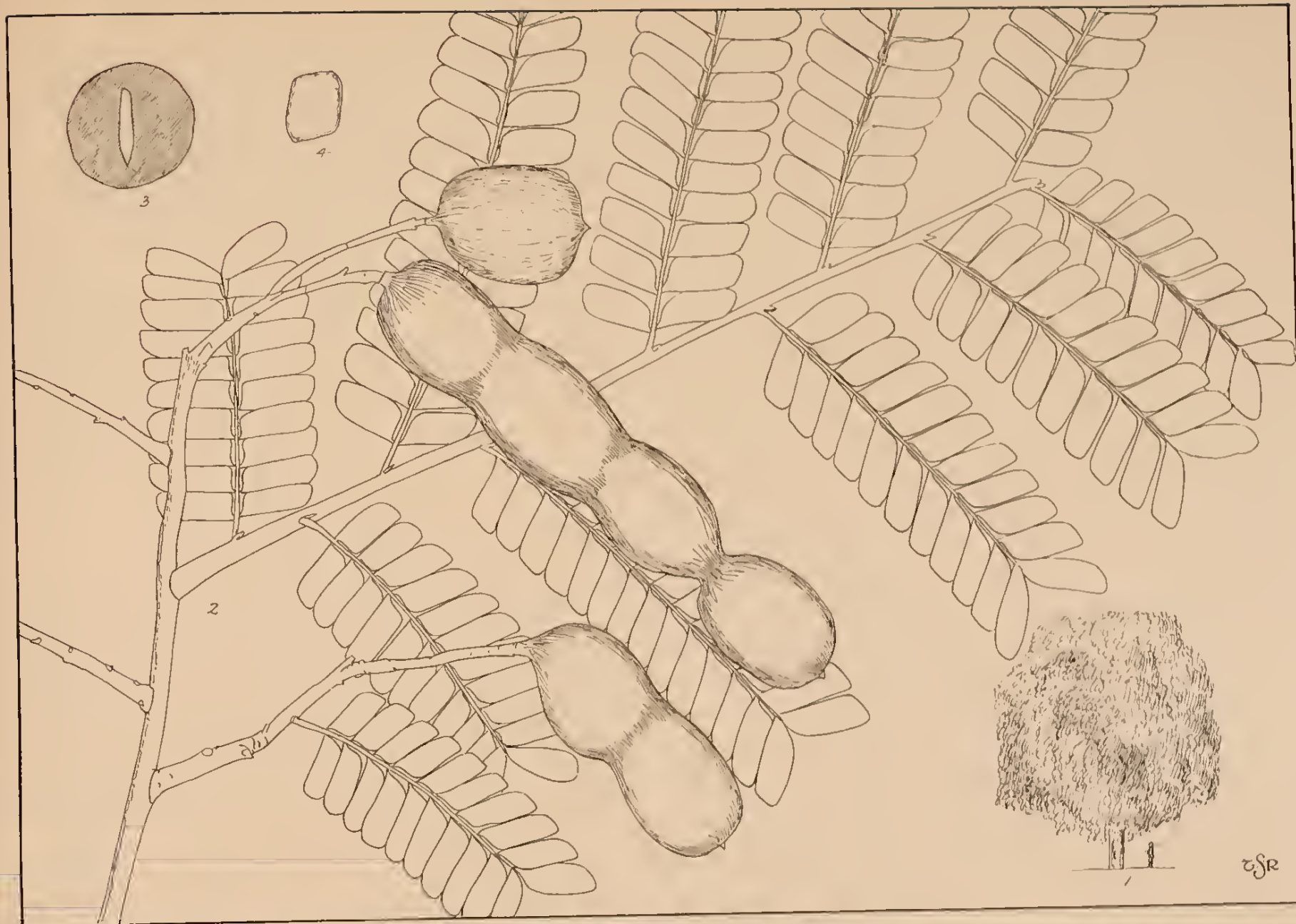
*Afzelia quanzensis*.



*Cordyla africana.*

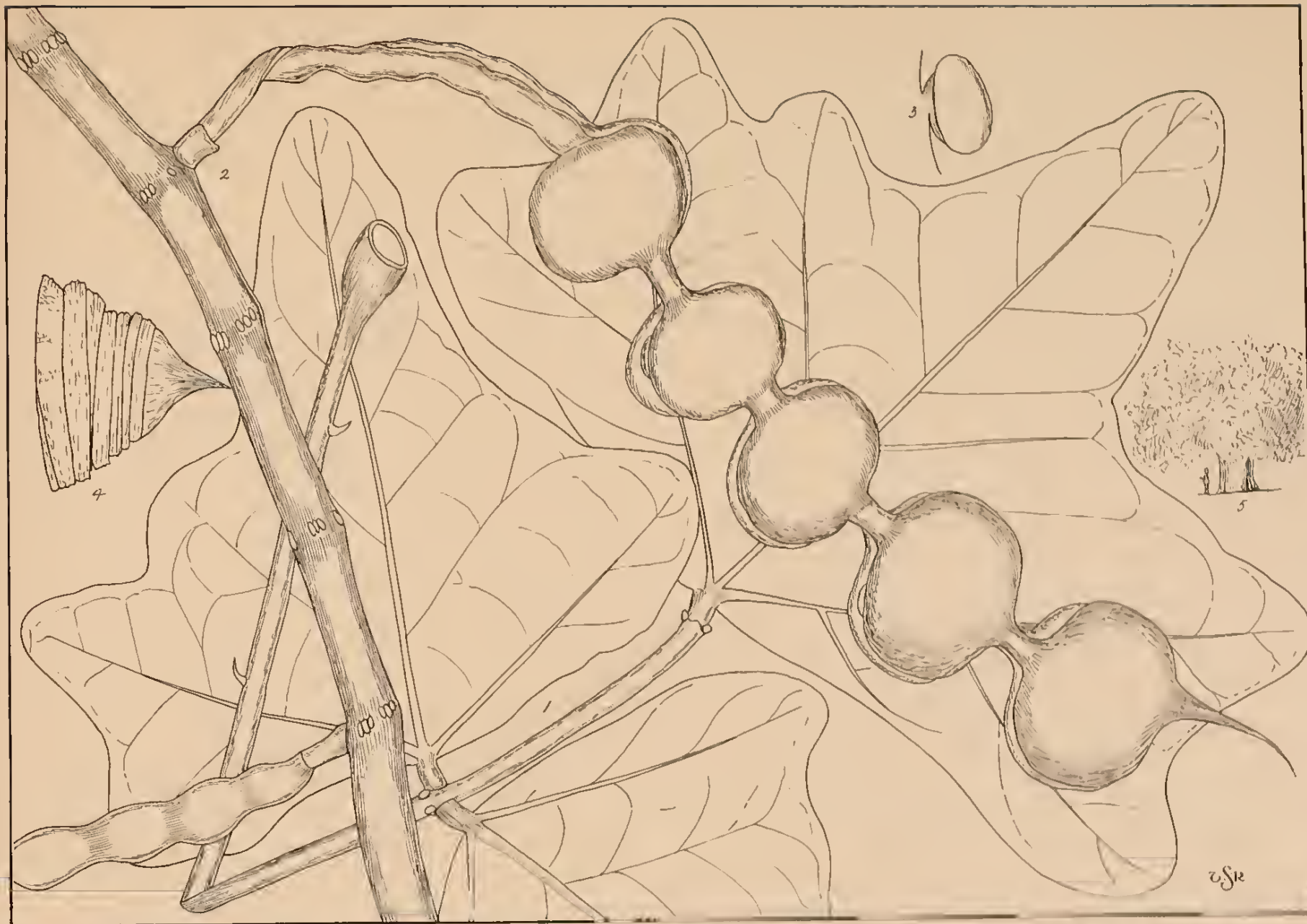






*Tamarindus indica.*





*Erythrina Livingstoniana.*





A. *Baphia ovata*.B. *Peltophorum africanum*.





A. *Bolusanthus speciosus*.

B. *Lonchocarpus laxiflorus*.







*Sophora tomentosa.*

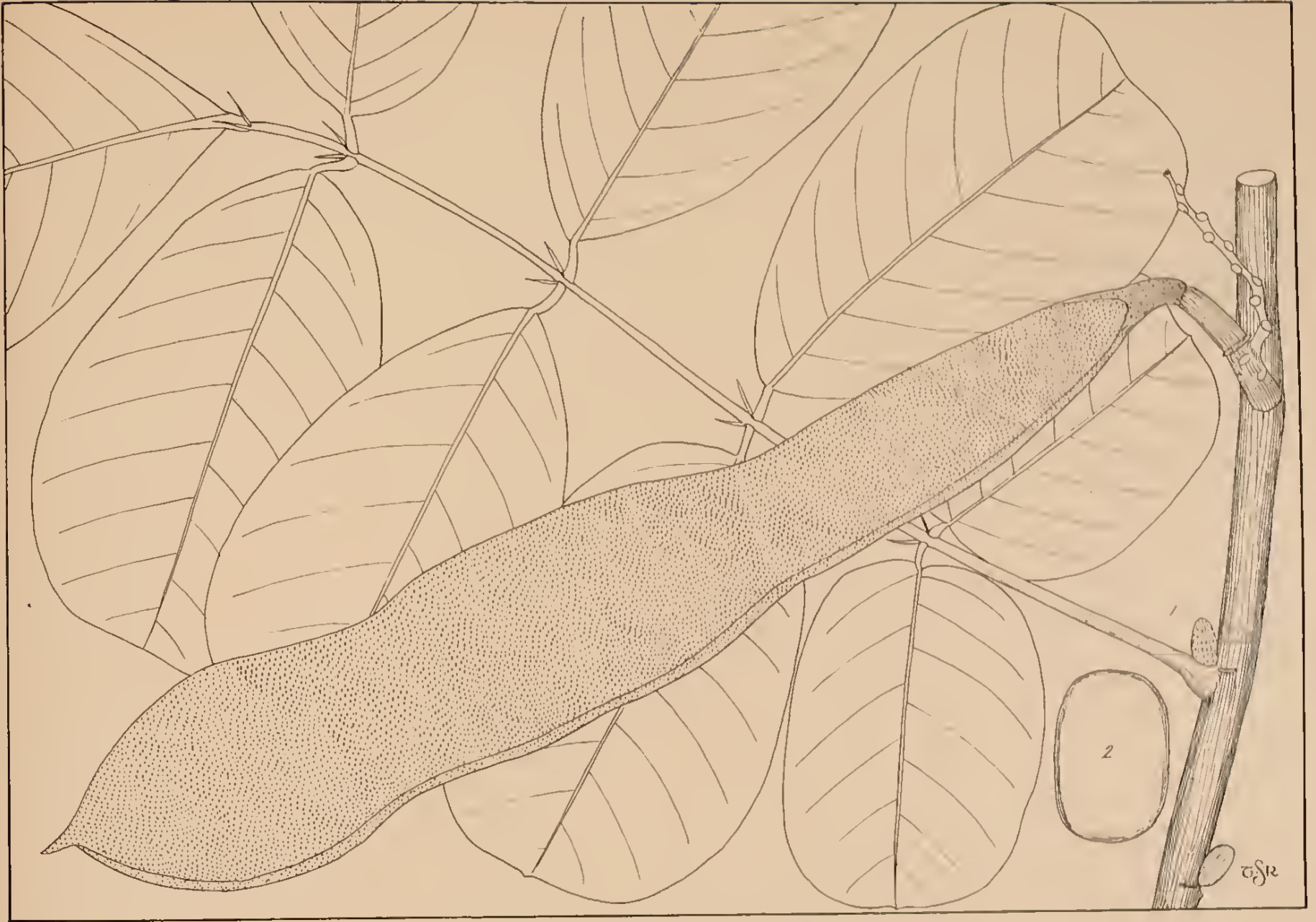




*Swartzia madagascariensis.*

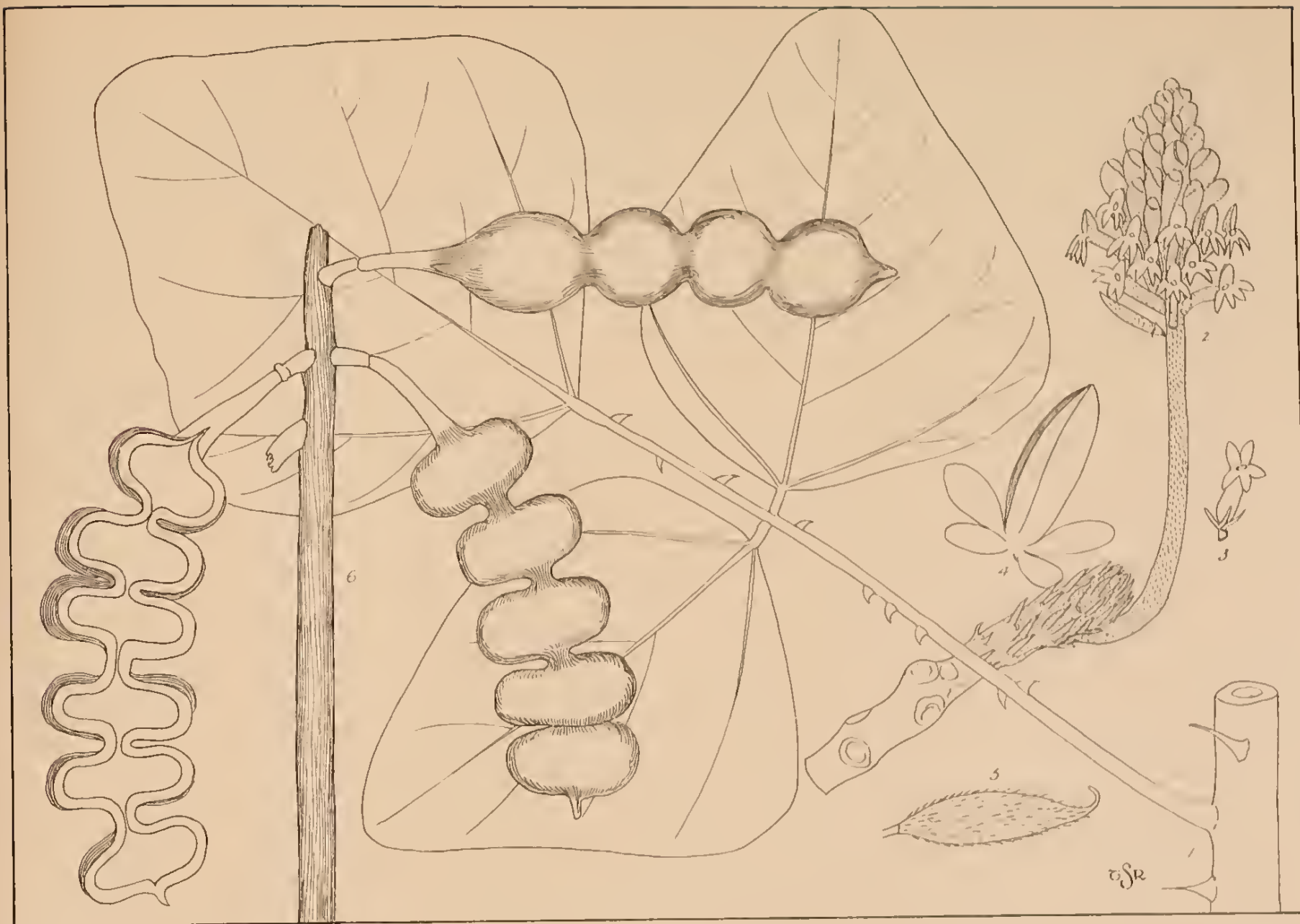






*Lonchocarpus mossambicensis.*





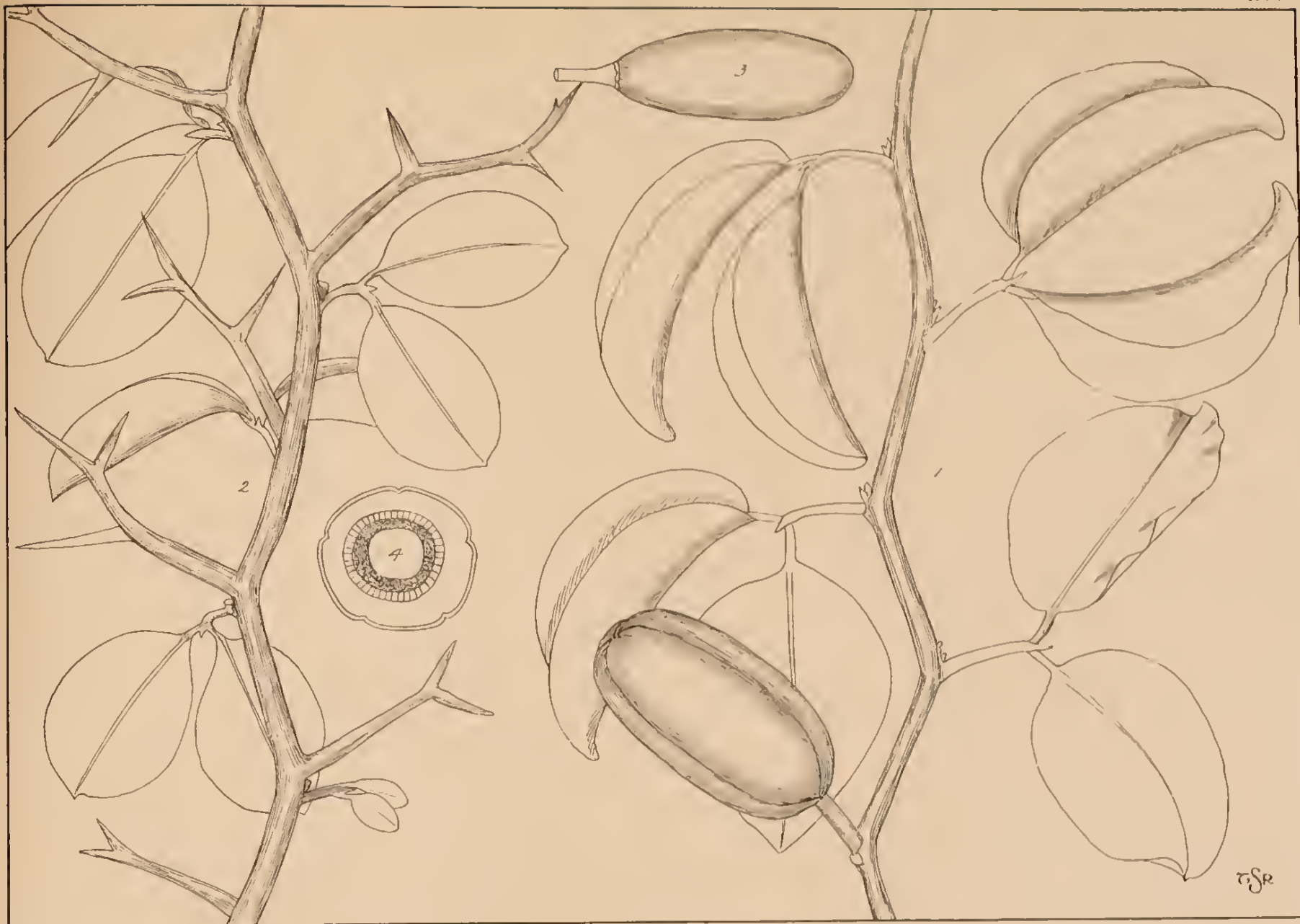
*Erythrina mossambicensis*.





A. *Albizzia umbalusiana*.B. *Schotia brachypetala*.

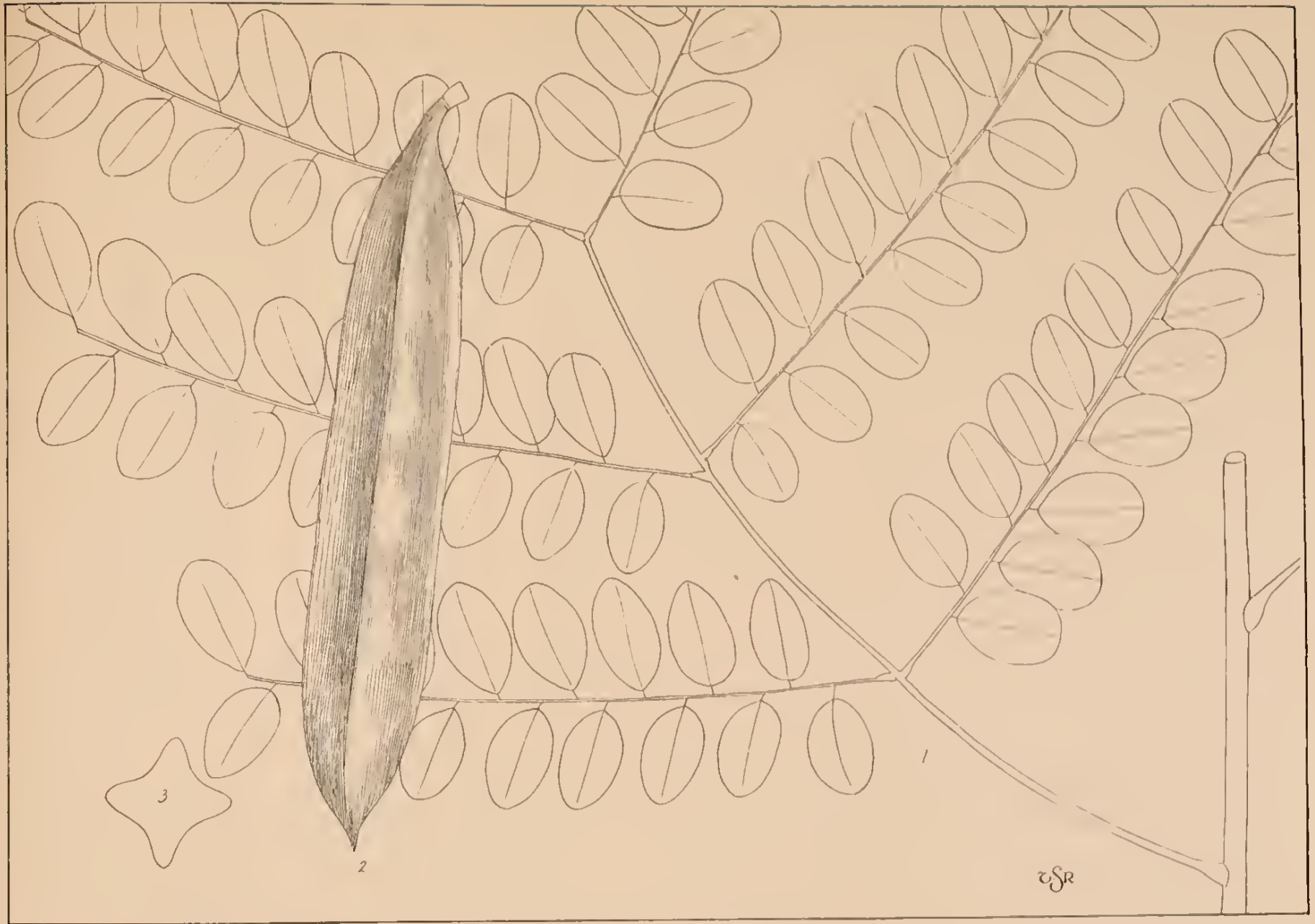




*Trachylobium mozambicensis.*







*Tetrapleura obtusangula.*





*Albizzia fastigiata.*







*Pterocarpus crinaceus.*





*Albizzia mozambicensis.*





A. *Weihea subpeltata*.B. *Combretum lomucense*.



A. *Combretum microphyllum*.B. *Combretum truncatum*.C. *Combretum holosericeum*.





A. *Combretum Zeyheri*.B. *Combretum Arengense*.C. *Combretum Bajonense*.D. *Combretum ellipticum*.





A. *Terminalia sericea*.

B. *Terminalia obovata*.

C. *Combretum myrtifolium*.







*Sonneratia acida.*





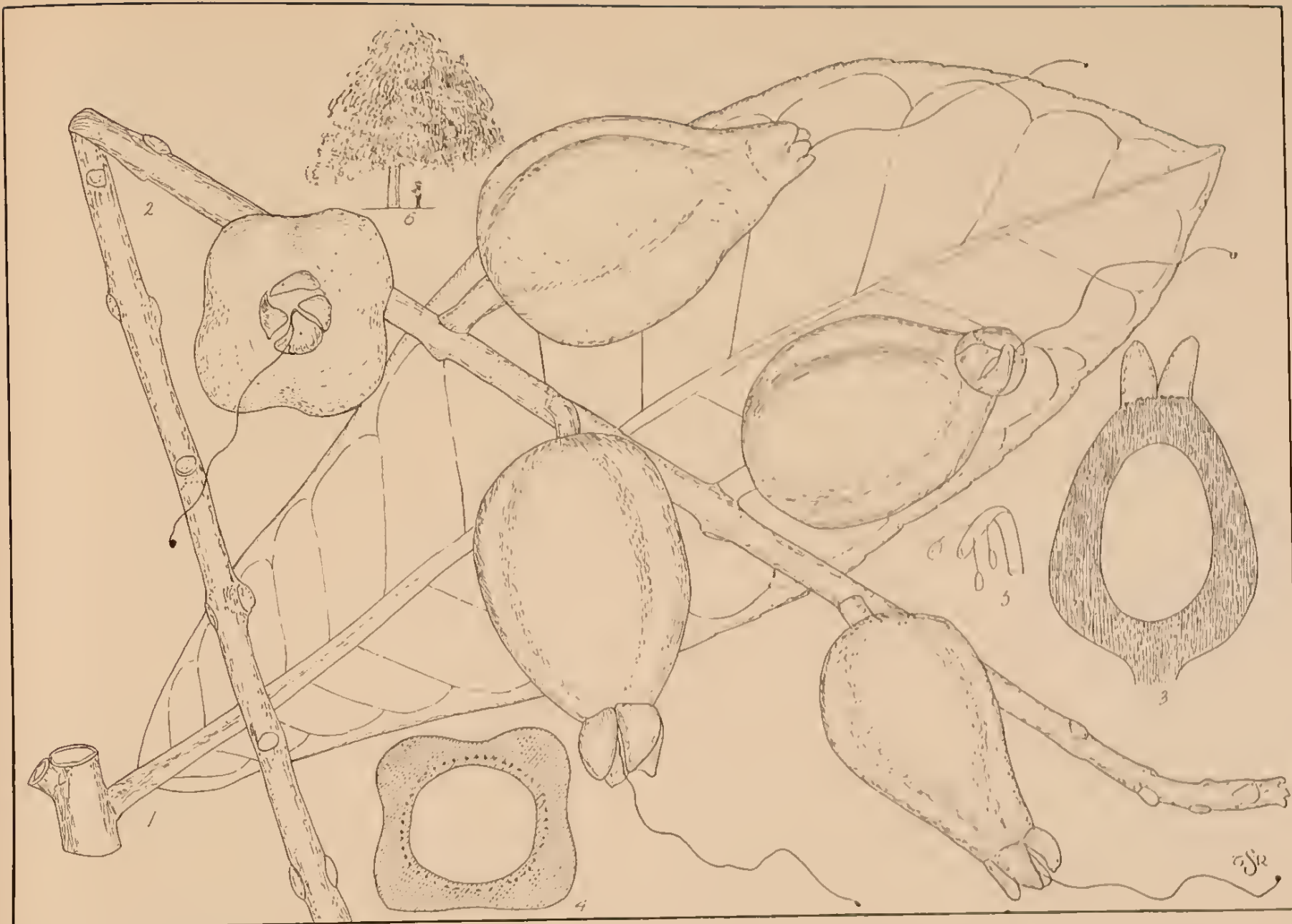
*Ceriops Candolleana.*





*Lumnitzera racemosa.*

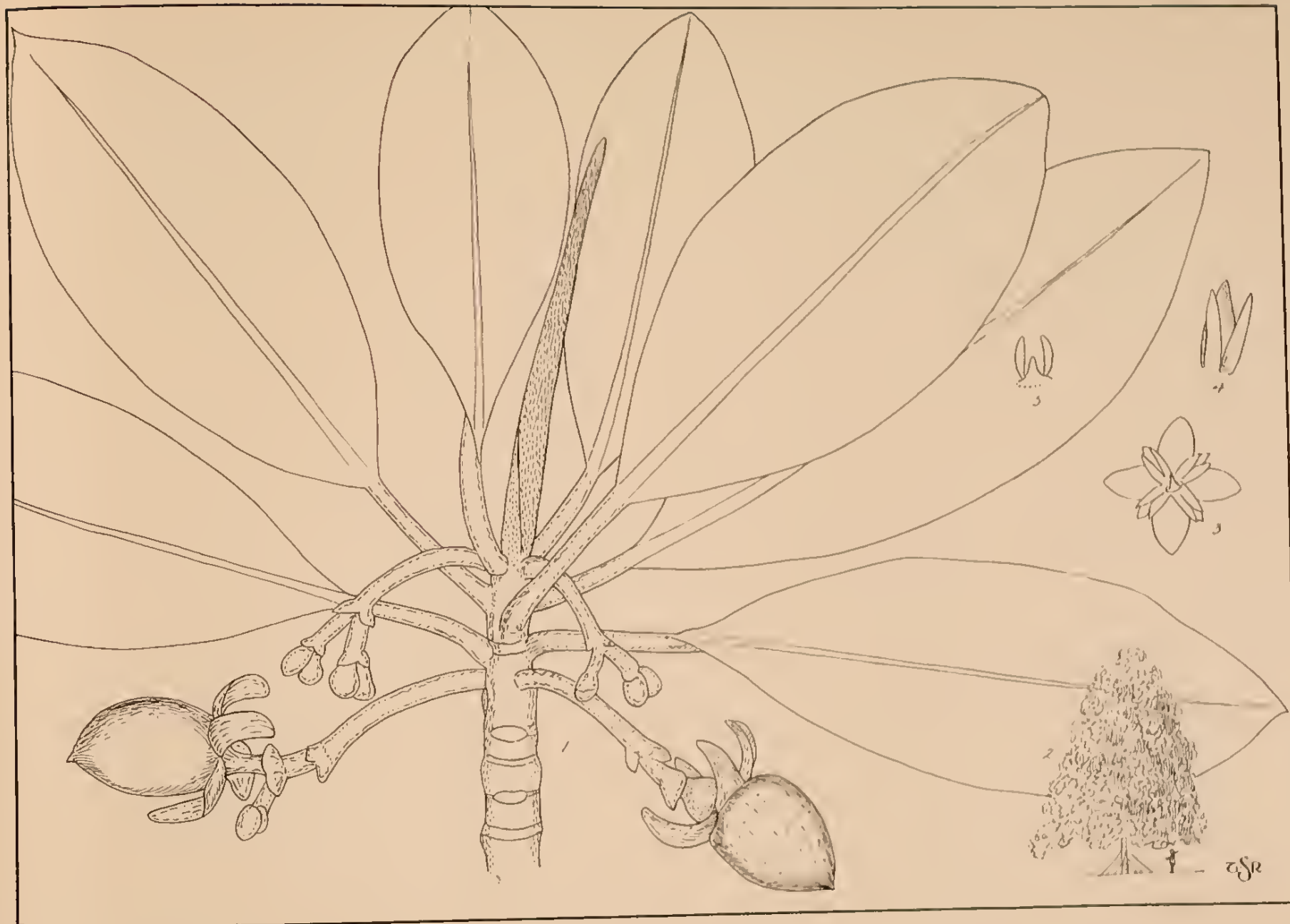




*Barringtonia racemosa.*







*Rhizophora mucronata.*

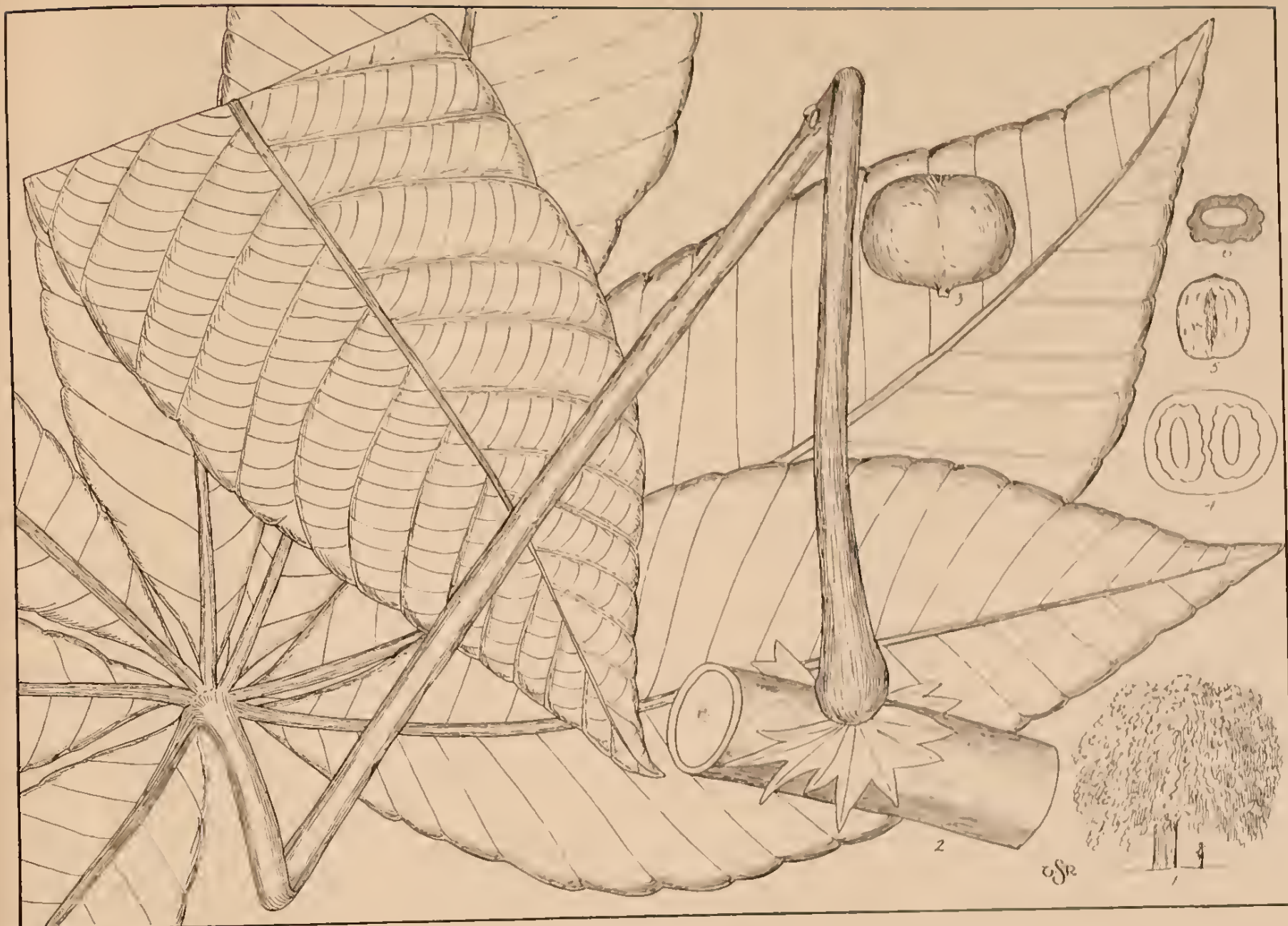




*Bruguiera gymnorhiza.*







*Barrettia umbrosa.*





*Milicia africana.*





A. *Vernonia senegalensis*.B. *Brachylana discolor*.



A. *Chrysophyllum natalense*.B. *Milicia spinosa*.





A. *Mimusops caffra*.B. *Spathodea alba*.



A. *Strychnos Gerrardii*.B. *Strychnos Henningsii*.C. *Strychnos suberosa*.





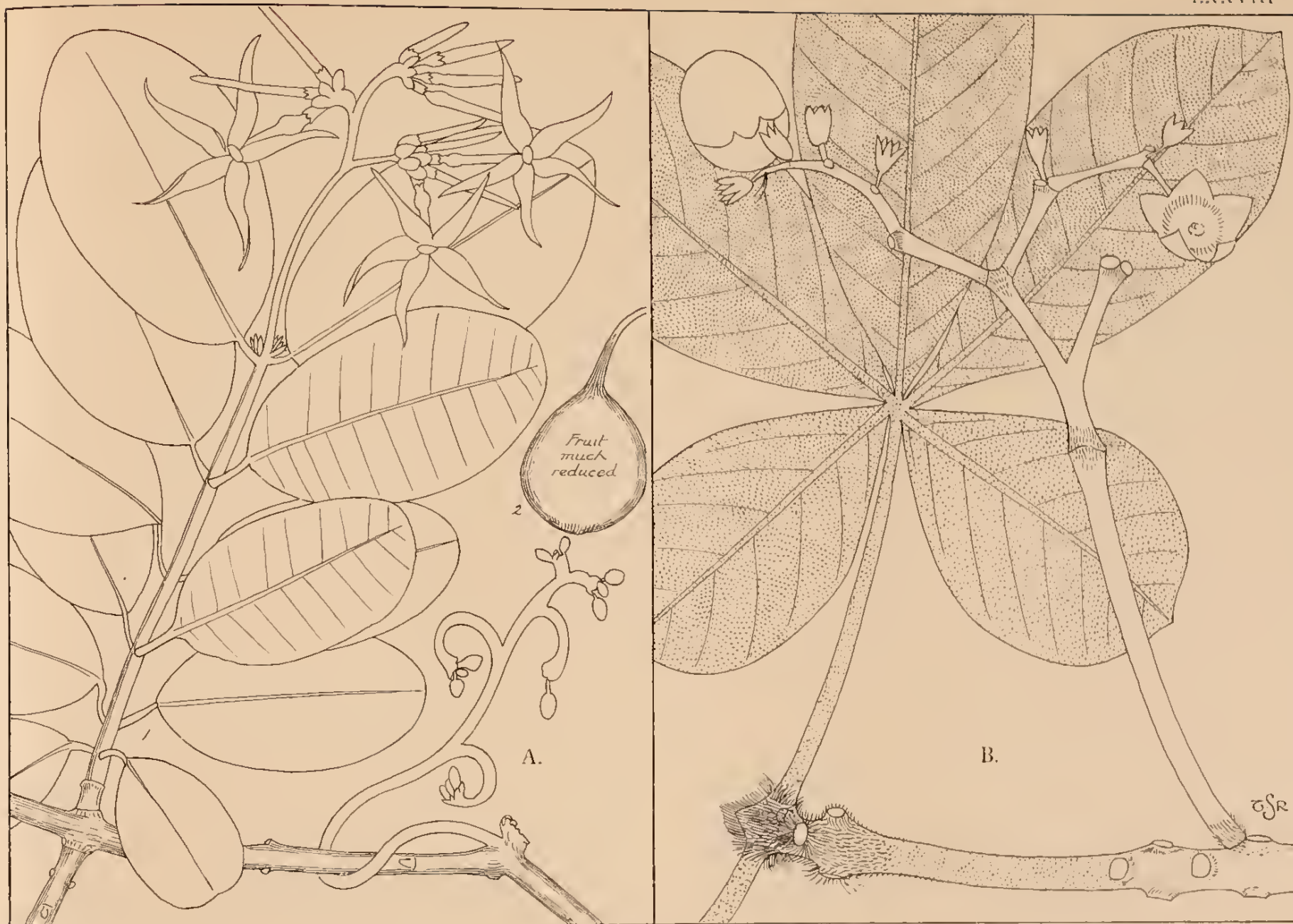


A. *Mimusops Henriquezii*.

B. *Nuxia oppositifolia*.

C. *Olea verrucosa*.



A. *Landolphia florida*.B. *Vitex villosa*.







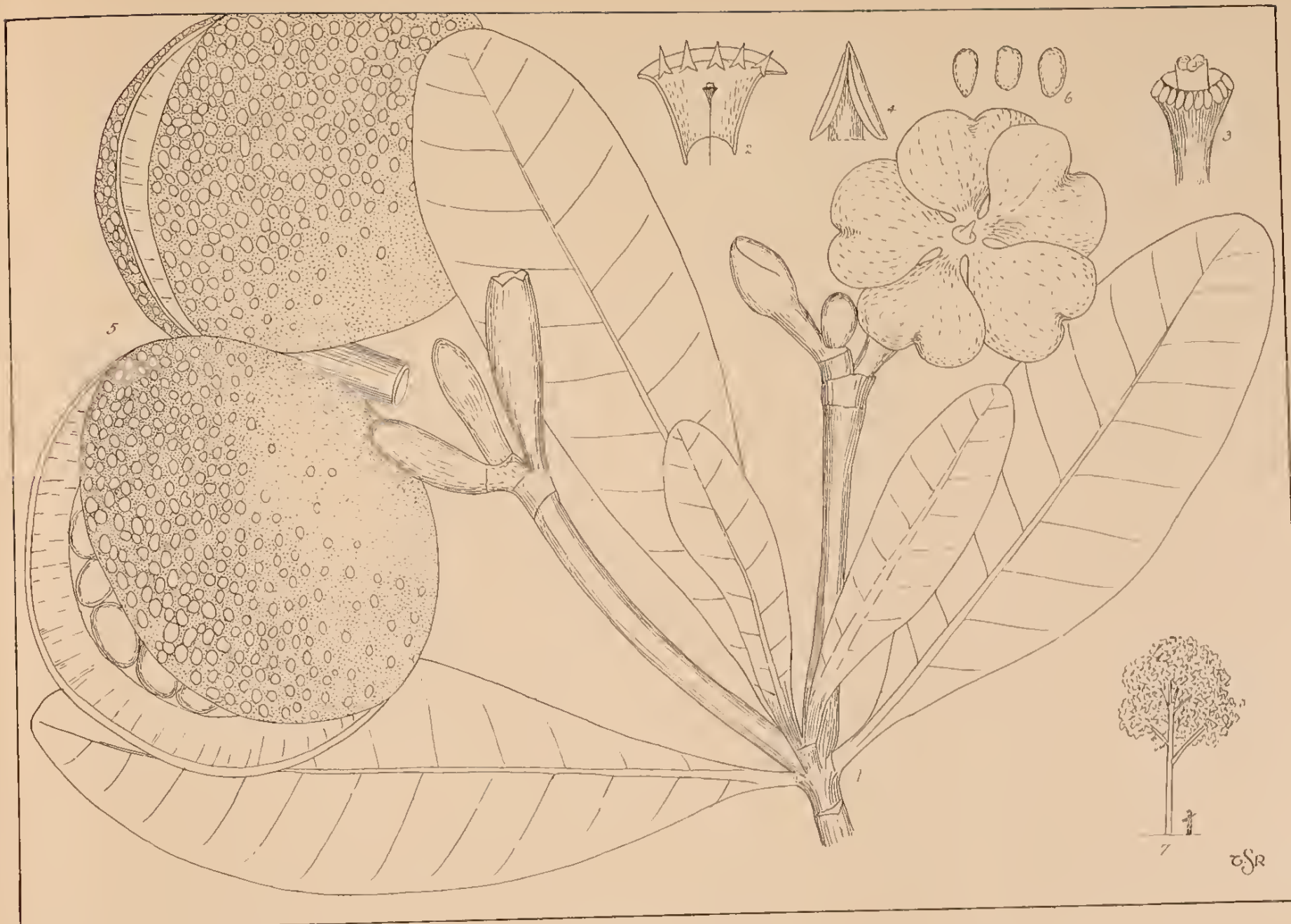
*Landolphia Kirkii*.



A. *Conopharyngia elegans*.B. *Strophanthus grandiflorus*.







*Voacanga Thouarsii.*

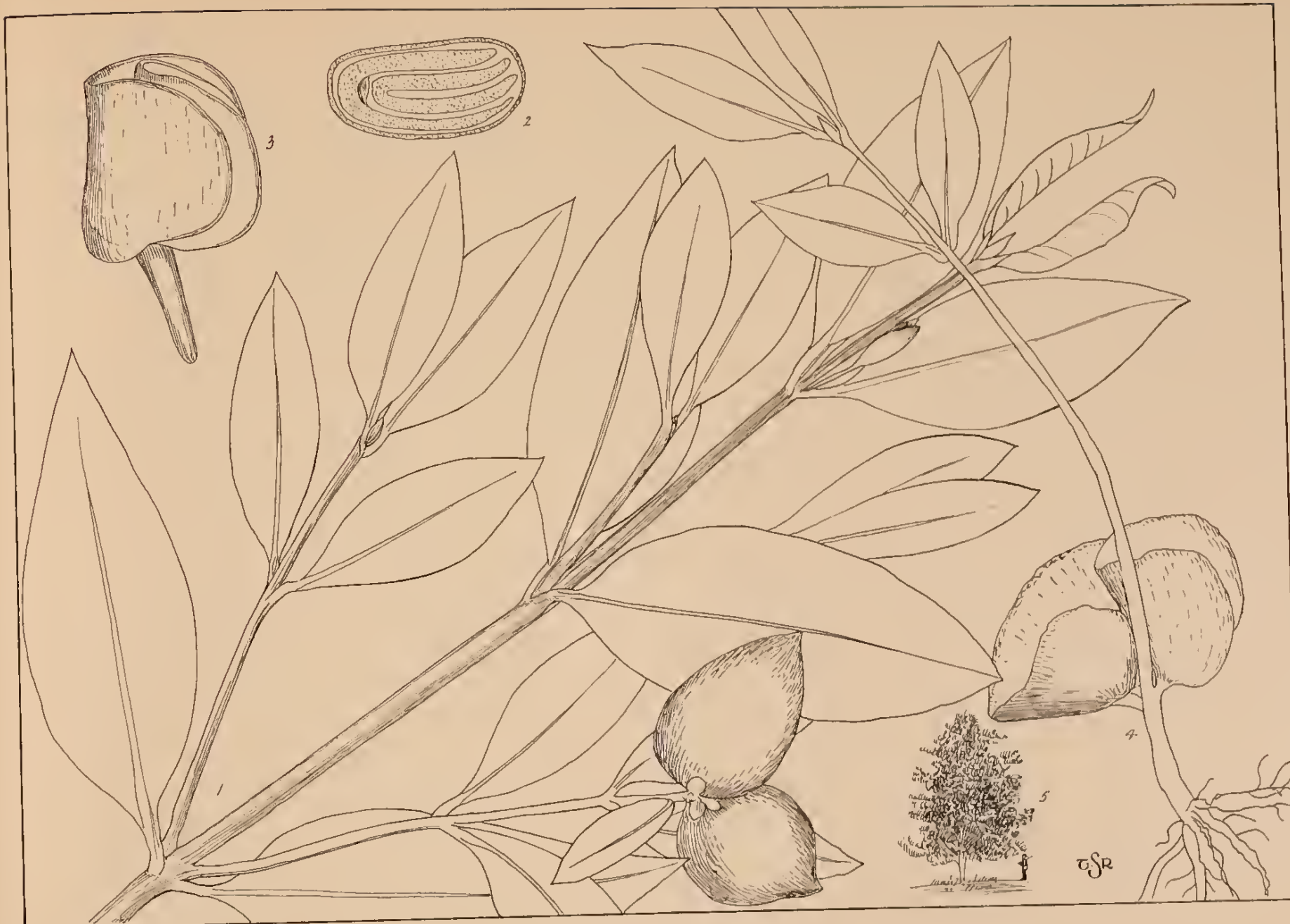




*Kigelia pinnata*.

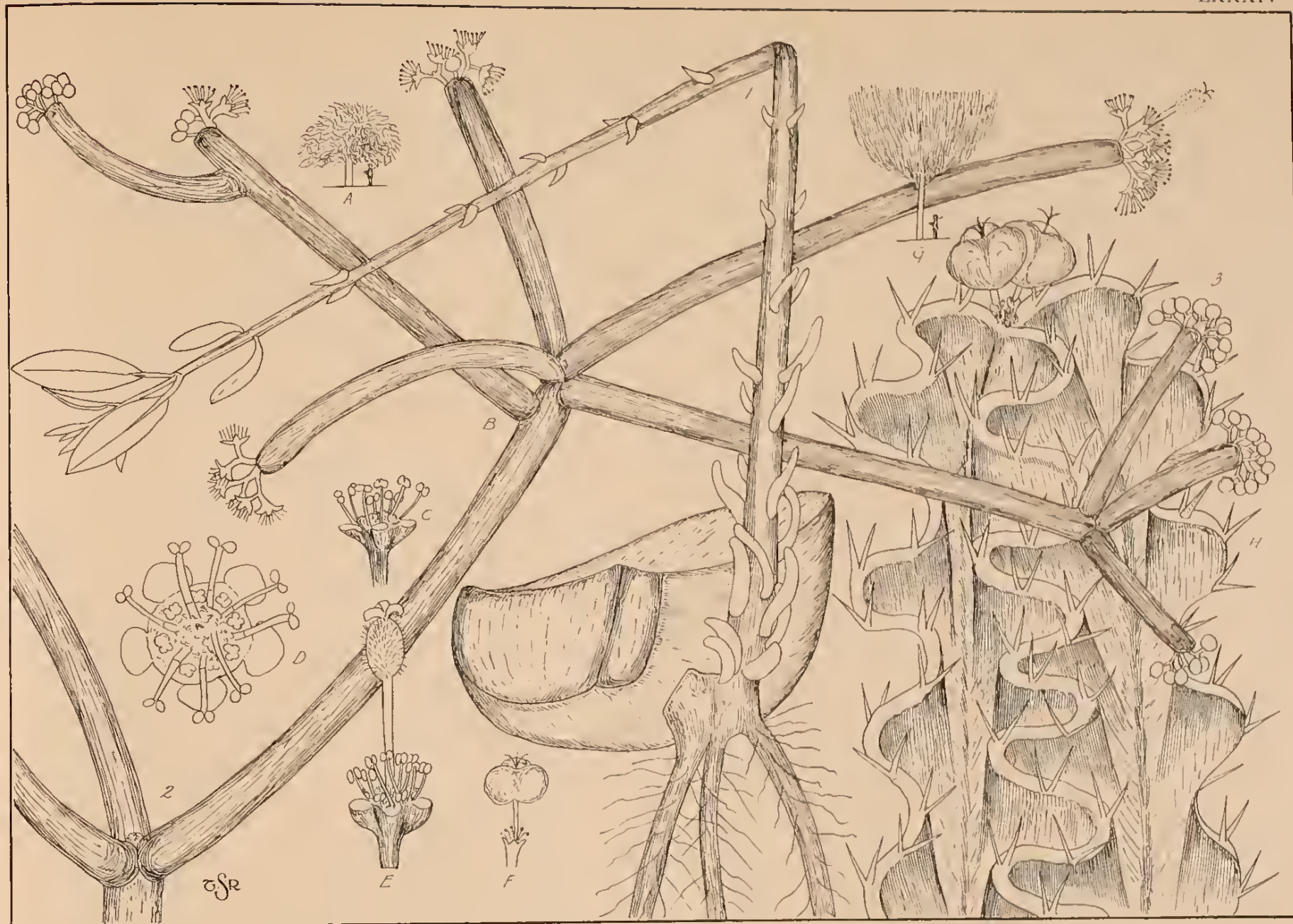






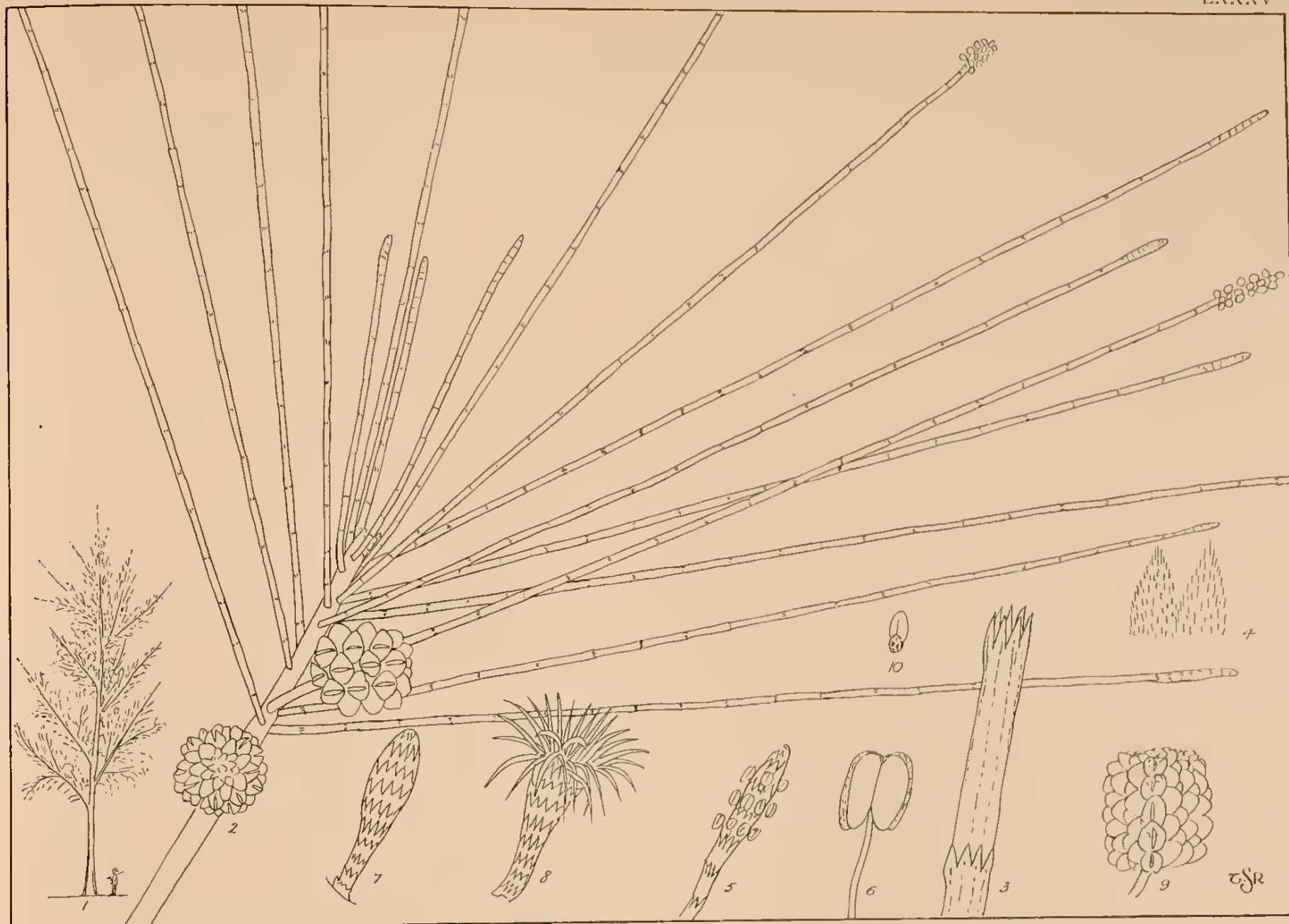
*Avicennia officinalis.*



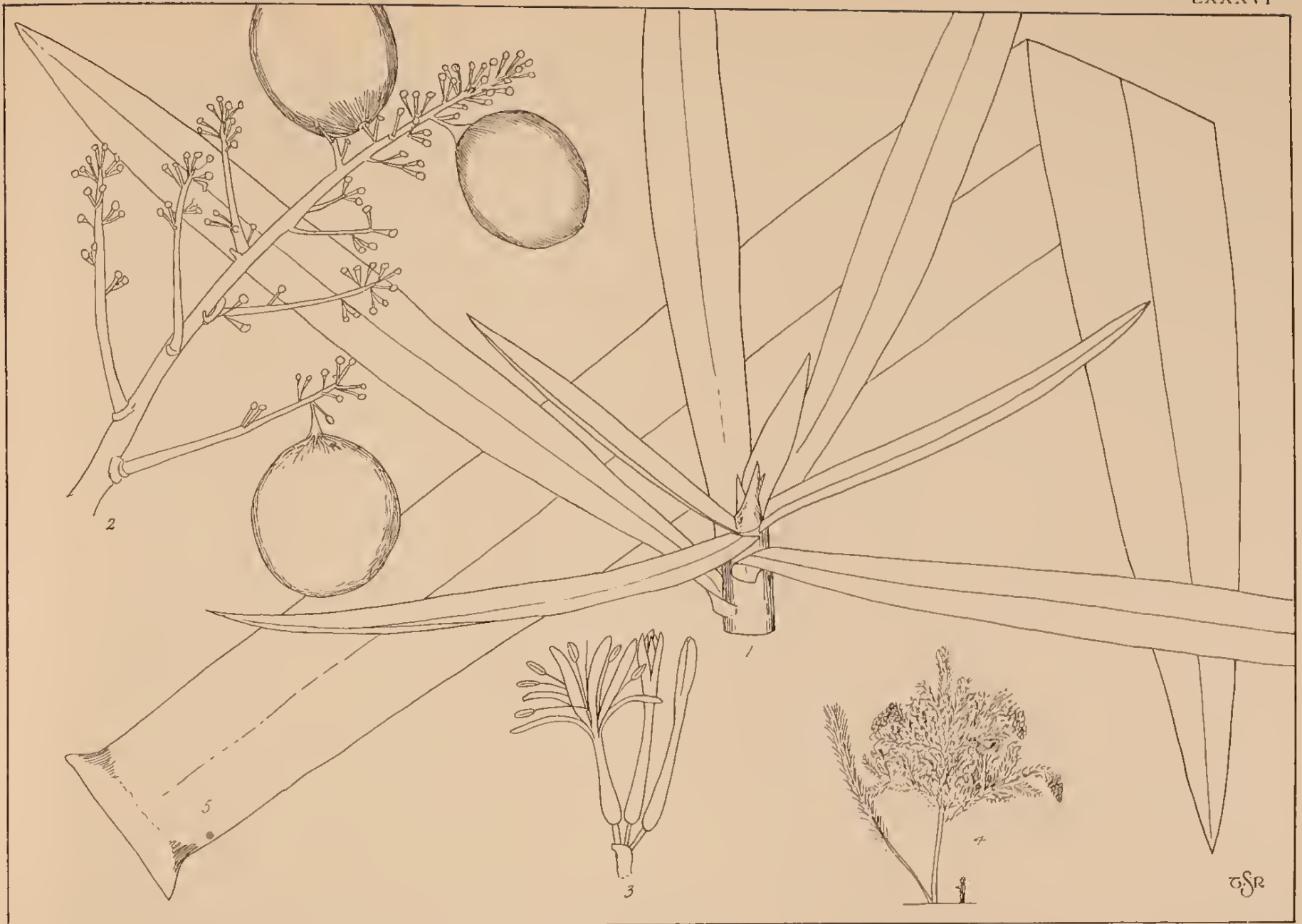
1. Seedling of *Carapa moluccensis*.2. *Euphorbia Tirucalli*.3. *Euphorbia grandidens*.





*Casuarina africana.*



*Dracæna reflexa.*





*Ficus silicea.*

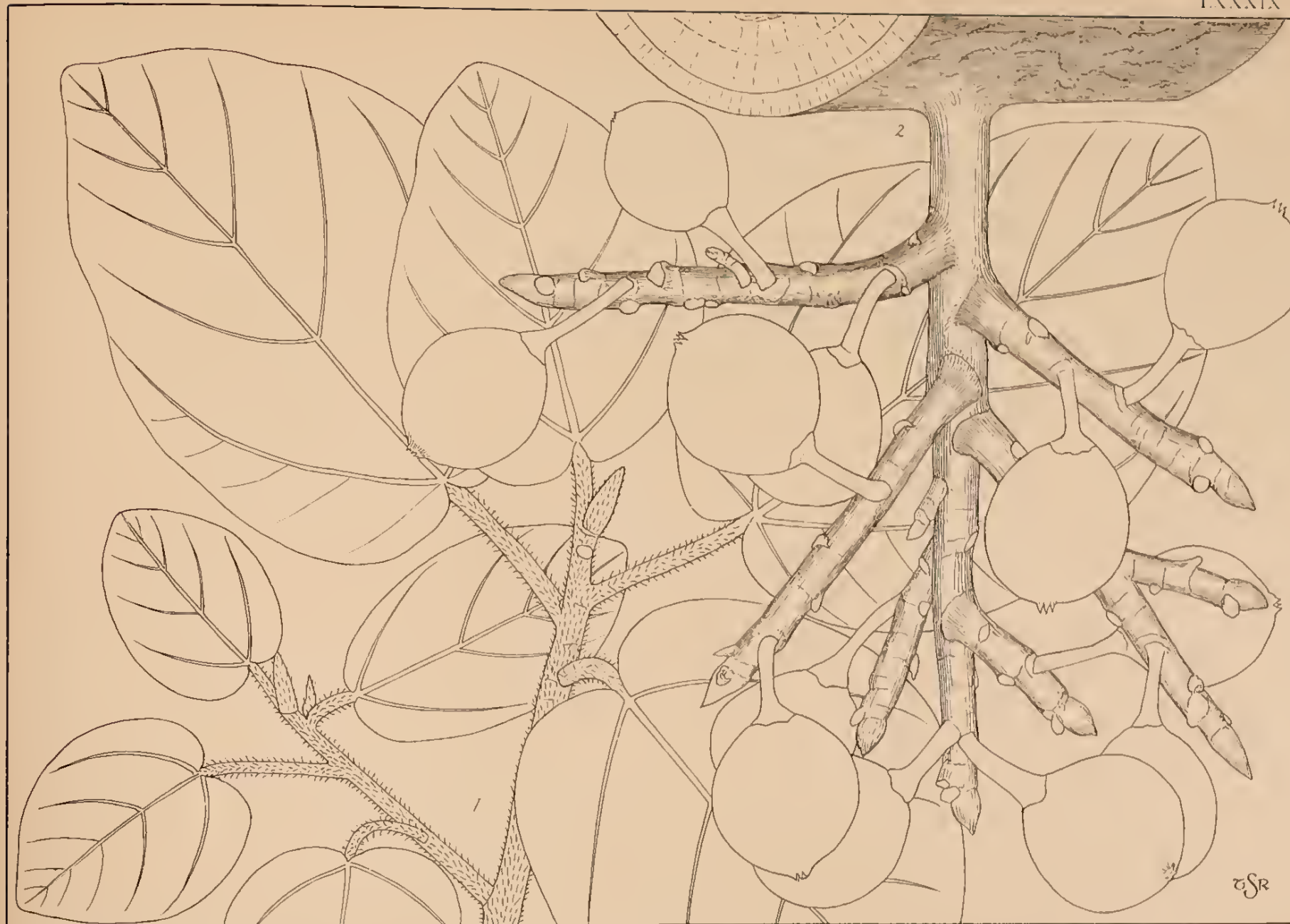




*Ficus umbrosa.*







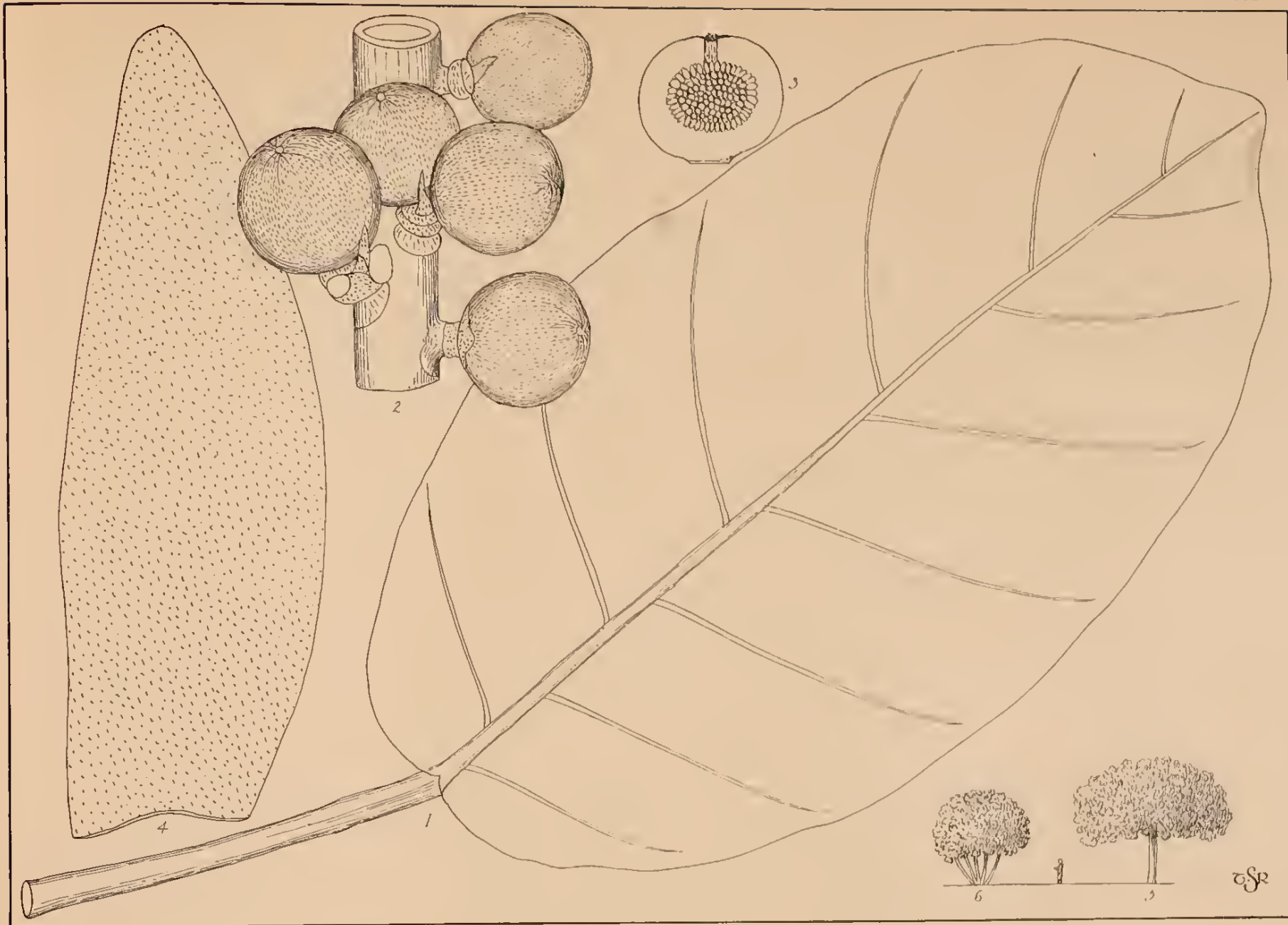
*Ficus integrifolia.*



A. *Ficus natalensis*, var. *pedunculata*.B. *Ficus depauperata*.C. *Ficus palustris*.







*Ficus utilis.*



A. *Ficus Howardiana*.B. *Ficus Delagoensis*.







A. *Ficus Zuvalensis*.

B. *Ficus Magenjensis*.



A. *Ficus cordata*.B. *Ficus picta*.C. *Ficus obovata*.





A. *Ficus montana*.B. *Ficus capensis*.C. *Ficus scabra*.





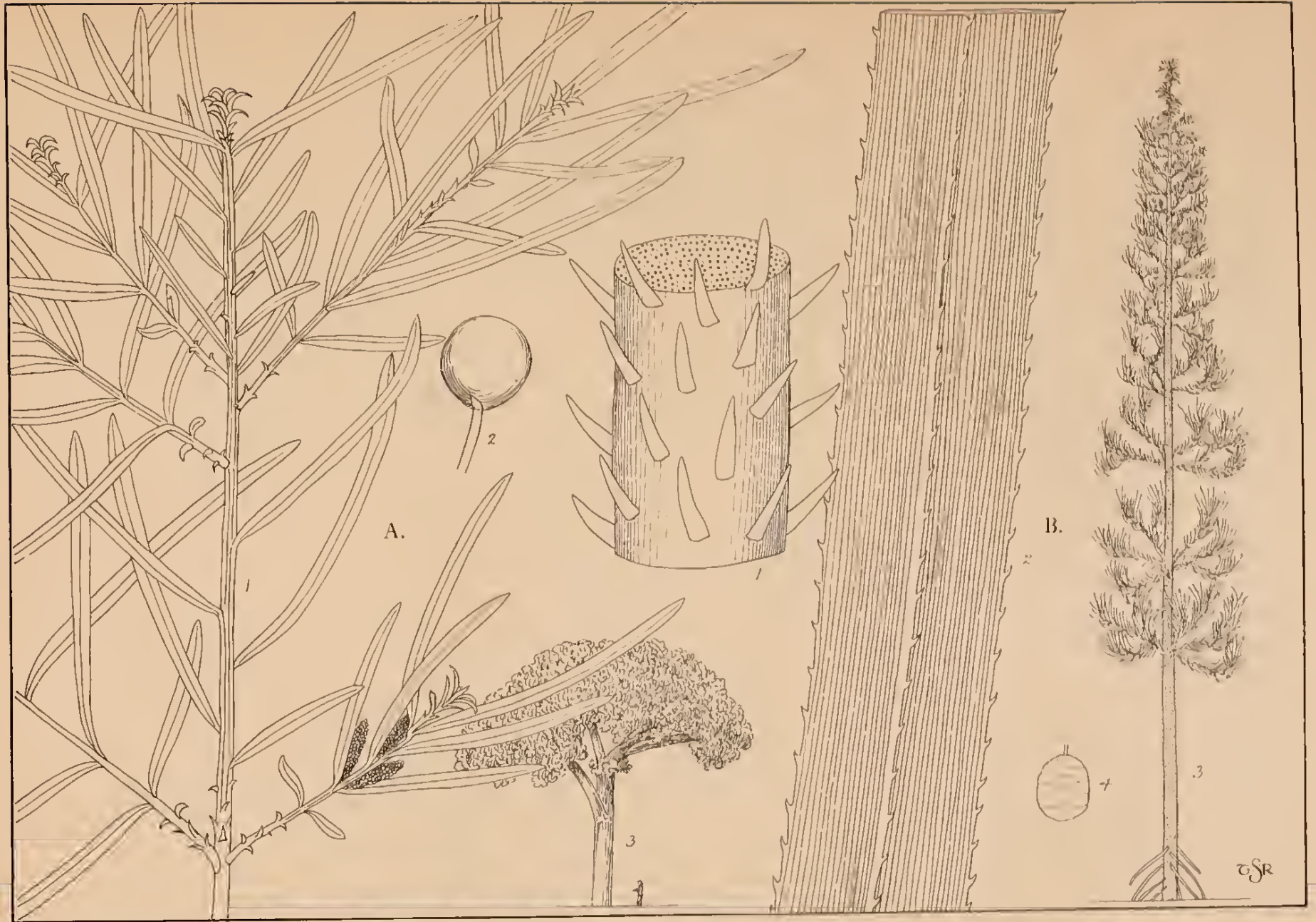
A. *Trema bracteolata*.

B. *Celtis* (?) *lactea*.

C. *Celtis* *Kraussiana*.





A. *Podocarpus elongata*.B. *Pandanus livingstonianus*.



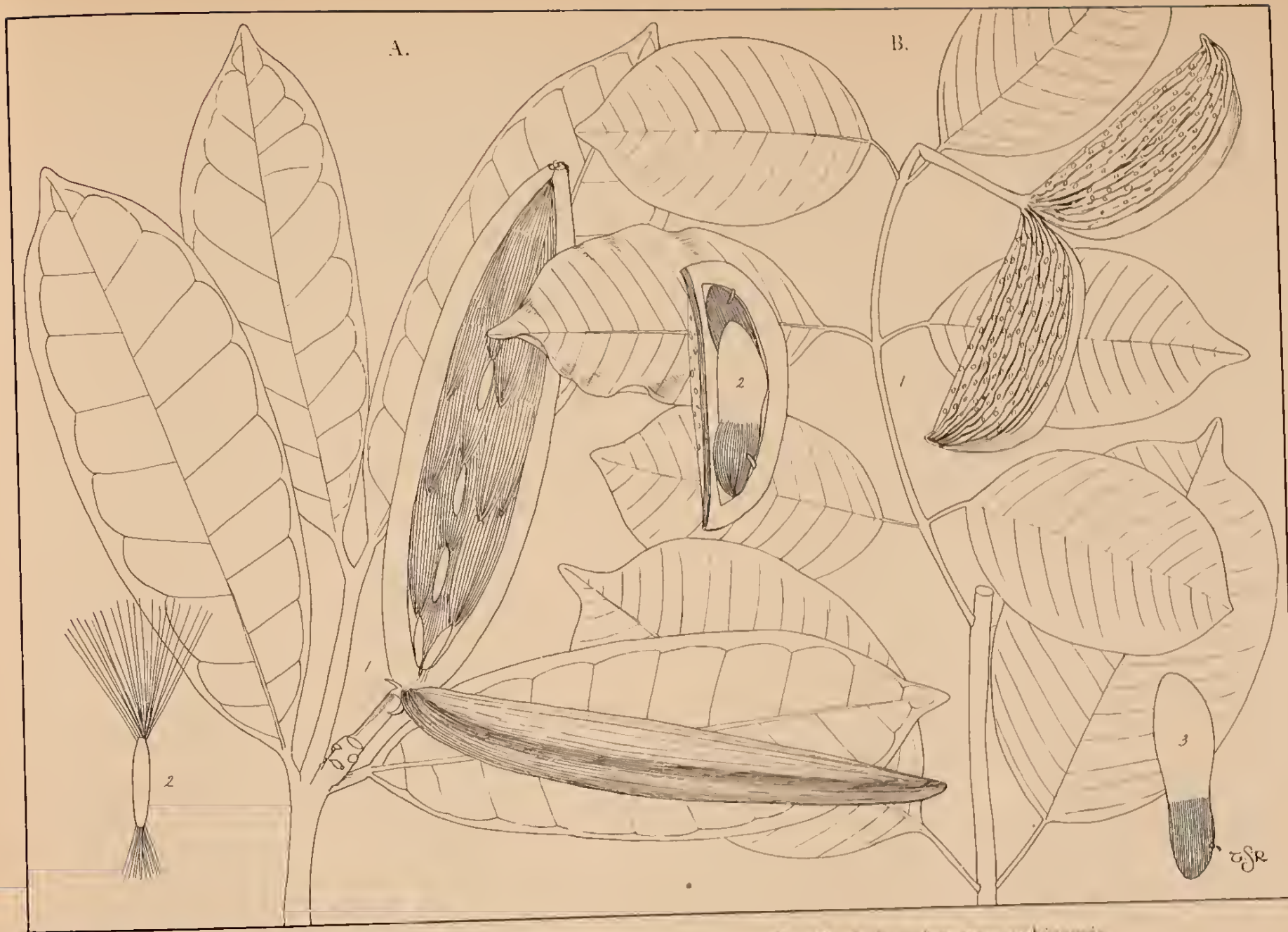


A. *Clerodendron glabrum*.

B. *Raphia vinifera*.





A. *Mascarenhasia elastica*.B. *Diplorhynchus mossambicensis*.





A. *Excæcaria magenjensis*.

B. *Excæcaria africana*.







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